VOLUME 24 / NUMBER 15
AUGUST 8, 1986
ACC. NOS. N86-24652 TO N86-25321

STAR
AN ABSTRACT JOURNAL

Scientific and Technical Aerospace Reports

PRODUCED BY THE
SCIENTIFIC AND TECHNICAL
INFORMATION
BRANCH

NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WHAT YOU CAN DO FOR *STAR*

All users of this abstract service are urged to forward reports to be considered for announcement in *STAR*. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those that you will transmit to NASA, DoD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

Reprints of journal articles, book chapters, and conference papers are also welcome. These will be considered for announcement in *STAR's* companion journal, *International Aerospace Abstracts*.

You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on public sale at the National Technical Information Service. Copyrighted publications will be announced but not distributed or sold.

PURCHASE OF *STAR*

The semimonthly issues are available for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

PUBLISHED BY:

UNITED STATES GOVERNMENT
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SCIENTIFIC AND TECHNICAL INFORMATION BRANCH
Scientific and Technical Aerospace Reports, Volume 24, is prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by RMS Associates.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through March 22, 1988.

US ISSN 0036-8741

INTRODUCTION

Scientific and Technical Aerospace Reports (STAR) is a major component of a comprehensive National Aeronautics and Space Administration information system covering aeronautics, space, and supporting disciplines. *STAR* is issued on the 8th and 23rd of each month and announces current publications of the following types:

- NASA, NASA contractor, and NASA grantee reports
- Reports issued by other U.S. Government agencies, domestic and foreign institutions, universities, and private firms
- Translations in report form
- NASA-owned patents and patent applications
- Dissertations and theses

Cumulative index volumes are published annually.

Journal, book, and conference literature, cover-to-cover journal translations, and certain foreign dissertations are announced in a companion journal, *International Aerospace Abstracts (IAA)*, available on subscription from the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

SUBJECT SCOPE

Subject scope of *STAR*, and *IAA* includes all aspects of aeronautics and space research and development, supporting basic and applied research, and applications. Aerospace aspects of earth resources, energy development, conservation, oceanography, environmental protection, urban transportation, and other topics of high national priority are also covered.

OTHER NASA PUBLICATIONS

Other NASA publications and information services are described in the publication, *The NASA Scientific and Technical Information System ... and How to Use It*, available without charge from the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

HOW TO USE *STAR* SUBJECT CATEGORIES

STAR is categorized by 10 major subject divisions divided into 74 specific subject categories and one general category/division. The major subject divisions are listed in the Table of Contents, together with a note for each that defines its scope and provides any cross-references. For example:

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

Each major division is further divided into as many as nine specific categories, which are identified by category numbers.

Abstracts in *STAR* are grouped by specific category, the categories appearing in sequential order. Category breaks in the abstract section are identified by the category number and title, and a scope note. Cross-references to other categories are provided as appropriate. For example:

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

CROSS-REFERENCES

Individual *STAR* abstracts are not ordinarily cross-referenced, except for certain conference reports or book translations that have had separate abstracts written for their component papers or chapters. Citations and abstracts of the components follow immediately after those of the parent document. When the subject content of a component differs sufficiently from the general content of the parent, a cross-reference citation also is printed at the end of the category to which it normally would have been assigned if it were independent.

DOCUMENTS ON MICROFICHE

Documents on microfiche[1] are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

AVAILABILITIES

One or more sources from which a document announced in *STAR* is available to the public is given in each citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, as indicated above, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Adminstration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its' Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this Introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of $1.50 each, postage free. (See discussion of NASA patents and patent applications below.)

Avail: ESDU. Pricing information on specific data, computer programs, and details on ESDU topic categories can be obtained from ESDU International Ltd. Requesters in North America should use the Virginia address while all other requesters should use the London address, both of which are on page vi.

NASA PATENTS AND PATENT APPLICATIONS

Patents and patent applications owned by NASA are announced in *STAR* under appropriate subject categories and are referenced in the *STAR* indexes. In the Report/Accession Number Index, patents are indexed by the NASA Case Number (which appears in lieu of the report number in other indexes), the U.S. Patent Number, the U.S. Patent Application Serial Number, and the U.S. Patent Class. Patent applications for which patents have not yet been issued are indexed by the NASA Case Number and the U.S. Patent Application Serial Number.

NASA *patent application specifications* are sold in paper copy by the National Technical Information Service at price code A02. Microfiche are sold at price code A01. The US-Patent-Appl-SN- number should be used in ordering either paper copy or microfiche from NTIS. Printed copies of *patents* (which are not microfiched) are available for purchase at $1.50 per copy from:

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office. The patents and patent applications announced in *STAR* are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

Assistant General Counsel for Patent Matters/Code GP
National Aeronautics and Space Administration
Washington, D.C. 20546

ELIGIBILITY AND REGISTRATION FOR NASA INFORMATION PRODUCTS AND SERVICES

A variety of services is available to organizations of the following types that have registered with NASA to receive specific services or products:

1. NASA offices, research centers, contractors, subcontractors, grantees, and consultants;
2. Other U.S. Government agencies and their contractors;
3. Libraries in the United States that have arrangements with NASA to maintain collections of NASA documents for public reference;
4. Other organizations in the United States having a need for NASA documents in work related to aeronautics and space research;
5. Organizations abroad that have established reciprocal document exchange arrangements with NASA.

Only the central service points or central points of document acquisition and control within qualified organizations are eligible to register for NASA products and services. Domestic organizations that may be eligible to receive various classes of NASA publications and services should address their requests for registration or for further information to:

NASA Scientific and Technical Information Facility
ATTN: Registration Activity
P.O. Box 8757
B.W.I. Airport, Maryland 21240

Organizations abroad should direct requests to the same address, but to the attention of: International Exchange Program.

AVAILABILITY OF *STAR* ABSTRACTS ON MICROFICHE

Microfiche of the abstract sections of this issue and other issues of *STAR* are available on annual subscription from NTIS, Attn: Subscriptions, 5285 Port Royal Road, Springfield, Virginia 22161. Annual subscription rates are $70.00 North America; $140.00 foreign. Abstract sections for previous years retroactive to 1964 are available at the current rates. Microfiche for individual *STAR* issue abstract sections are not available.

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC: NASA and NASA-sponsored documents and a large number of aerospace publications are available to the public for reference purposes at the library maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN: An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England for public access. The British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy or microfiche of NASA and NASA-sponsored documents, those identified by both the symbols # and * from ESA - Information Retrieval Service European Space Agency, 8-10 rue Mario-Nikis, 75738 Paris CEDEX 15, France.

FEDERAL DEPOSITORY LIBRARY PROGRAM

In order to provide the general public with greater access to U.S. Government publications, Congress established the Federal Depository Library Program under the Government Printing Office (GPO), with 50 regional depositories responsible for permanent retention of material, inter-library loan, and reference services. At least one copy of nearly every NASA and NASA-sponsored publication, either in printed or microfiche format, is received and retained by the 50 regional depositories. A list of the regional GPO libraries, arranged alphabetically by state, appears on the inside back cover. These libraries are *not* sales outlets. A local library can contact a Regional Depository to help locate specific reports, or direct contact may be made by an individual.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

ESDU International, Ltd.
1495 Chain Bridge Road
McLean, Virginia 22101

ESDU International, Ltd.
251-259 Regent Street
London, W1R 7AD, England

Fachinformationszentrum Energie, Physik, Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space Administration
Scientific and Technical Information Branch (NTT-1)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey Library
National Center – MS 950
12201 Sunrise Valley Drive
Reston, Virginia 22092

U.S. Geological Survey Library
2255 North Gemini Drive
Flagstaff, Arizona 86001

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey Library
Box 25046
Denver Federal Center, MS 914
Denver, Colorado 80225

NTIS PRICE SCHEDULES

(Effective October 1, 1985)

Schedule A
STANDARD PRICE DOCUMENTS AND MICROFICHE

PRICE CODE	PAGE RANGE	NORTH AMERICAN PRICE	FOREIGN PRICE
A01	Microfiche	$ 5.95	$11.90
A02-A03	001-050	9.95	19.90
A04-A05	051-100	11.95	23.90
A06-A09	101-200	16.95	33.90
A10-A13	201-300	22.95	45.90
A14-A17	301-400	28.95	57.90
A18-A21	401-500	34.95	69.90
A22-A25	501-600	40.95	81.90
A99	601-up	*	*
NO1		$40.00	70.00
NO2		40.00	70.00

Schedule E
EXCEPTION PRICE DOCUMENTS AND MICROFICHE

PRICE CODE	NORTH AMERICAN PRICE	FOREIGN PRICE
E01	$ 7.50	15.00
E02	10.00	20.00
E03	11.00	22.00
E04	13.50	27.00
E05	15.50	31.00
E06	18.00	36.00
E07	20.50	41.00
E08	23.00	46.00
E09	25.50	51.00
E10	28.00	56.00
E11	30.50	61.00
E12	33.00	66.00
E13	35.50	71.00
E14	38.50	77.00
E15	42.00	84.00
E16	46.00	92.00
E17	50.00	100.00
E18	54.00	108.00
E19	60.00	120.00
E20	70.00	140.00
E99	*	*

*Contact NTIS for price quote.

IMPORTANT NOTICE

NTIS Shipping and Handling Charges (effective June 1, 1985)

U.S., Canada, Mexico — ADD $3.00 per TOTAL ORDER

All Other Countries — ADD $4.00 per TOTAL ORDER

Exceptions — Does NOT apply to:

ORDERS REQUESTING NTIS RUSH HANDLING
ORDERS FOR SUBSCRIPTION OR STANDING ORDER PRODUCTS *ONLY*

NOTE: Each additional delivery address on an order requires a separate shipping and handling charge.

VOLUME 24 NUMBER 15 / AUGUST 8, 1986

TABLE OF CONTENTS

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics.*

01 AERONAUTICS (GENERAL) 2409

02 AERODYNAMICS 2409
Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.
For related information see also *34 Fluid Mechanics and Heat Transfer*

03 AIR TRANSPORTATION AND SAFETY 2412
Includes passenger and cargo air transport operations; and aircraft accidents.
For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION 2413
Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.
For related information see also *17 Spacecraft Communications, Command and Tracking* and *32 Communications.*

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE 2414
Includes aircraft simulation technology.
For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

06 AIRCRAFT INSTRUMENTATION 2415
Includes cockpit and cabin display devices; and flight instruments.
For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

07 AIRCRAFT PROPULSION AND POWER 2415
Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.
For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

08 AIRCRAFT STABILITY AND CONTROL 2417
Includes aircraft handling qualities; piloting; flight controls; and autopilots.

09 RESEARCH AND SUPPORT FACILITIES (AIR) 2418
Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.
For related information see also *14 Ground Support Systems and Facilities (Space).*

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*

12 ASTRONAUTICS (GENERAL) 2419
For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

13 ASTRODYNAMICS 2419
Includes powered and free-flight trajectories; and orbit and launching dynamics.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE) 2420
Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.
For related information see also *09 Research and Support Facilities (Air).*

15 LAUNCH VEHICLES AND SPACE VEHICLES 2420
Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

16 SPACE TRANSPORTATION 2421
Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.
For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

17 SPACECRAFT COMMUNICATION, COMMAND AND TRACKING 2421
Includes telemetry; space communications networks; astronavigation; and radio blackout.
For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE 2422
Includes spacecraft thermal and environmental control; and attitude control.
For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

19 SPACECRAFT INSTRUMENTATION 2424
For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

20 SPACECRAFT PROPULSION AND POWER 2424
Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.
For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

23 CHEMISTRY AND MATERIALS (GENERAL) N.A.
Includes biochemistry and organic chemistry.

24 COMPOSITE MATERIALS 2426
Includes laminates.

25 INORGANIC AND PHYSICAL CHEMISTRY 2428
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.
For related information see also *77 Thermodynamics and Statistical Physics.*

26 METALLIC MATERIALS 2432
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 NONMETALLIC MATERIALS 2438
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

28 PROPELLANTS AND FUELS 2441
Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.
For related information see also *Physics.*

31 ENGINEERING (GENERAL) 2443
Includes vacuum technology; control engineering; display engineering; and cryogenics.

32 COMMUNICATIONS 2444
Includes land and global communications; communications theory; and optical communications.
For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

33 ELECTRONICS AND ELECTRICAL ENGINEERING 2449
Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuity.
For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

34 FLUID MECHANICS AND HEAT TRANSFER 2453
Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.
For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

35 INSTRUMENTATION AND PHOTOGRAPHY 2458
Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.
For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation.*

36 LASERS AND MASERS 2461
Includes parametric amplifiers.

37 MECHANICAL ENGINEERING 2463
Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

38 QUALITY ASSURANCE AND RELIABILITY 2465
Includes product sampling procedures and techniques; and quality control.

39 STRUCTURAL MECHANICS 2466
Includes structural element design and weight analysis; fatigue; and thermal stress.
For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.
For related information see also *Space Sciences.*

42 GEOSCIENCES (GENERAL) 2469

43 EARTH RESOURCES 2470
Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see *35 Instrumentation and Photography.*

44 ENERGY PRODUCTION AND CONVERSION 2471
Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

45 ENVIRONMENT POLLUTION 2473
Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

46 GEOPHYSICS 2475
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.
For space radiation see *93 Space Radiation.*

47 METEOROLOGY AND CLIMATOLOGY 2477
Includes weather forecasting and modification.

48 OCEANOGRAPHY 2480
Includes biological, dynamic and physical oceanography; and marine resources.

LIFE SCIENCES

Includes sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

51 LIFE SCIENCES (GENERAL) 2481
Includes genetics.

52 AEROSPACE MEDICINE 2482
Includes physiological factors; biological effects of radiation; and weightlessness.

53 BEHAVIORAL SCIENCES 2483
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT 2483
Includes human engineering; biotechnology; and space suits and protective clothing.

55 PLANETARY BIOLOGY N.A.
Includes exobiology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) N.A.

60 COMPUTER OPERATIONS AND HARDWARE 2485
Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

61 COMPUTER PROGRAMMING AND SOFTWARE 2487
Includes computer programs, routines, and algorithms.

62 COMPUTER SYSTEMS 2490
Includes computer networks.

63 CYBERNETICS 2490
Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

64 NUMERICAL ANALYSIS 2492
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY 2496
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS N.A.
Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS 2497
Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.
For related information see also *Engineering.*

70 PHYSICS (GENERAL) 2497
For geophysics see *46 Geophysics.* For astrophysics see *90 Astrophysics.* For solar physics see *92 Solar Physics.*

71 ACOUSTICS 2498
Includes sound generation, transmission, and attenuation.
For noise pollution see *45 Environment Pollution.*

72 ATOMIC AND MOLECULAR PHYSICS 2499
Includes atomic structure and molecular spectra.

73 NUCLEAR AND HIGH-ENERGY PHYSICS 2501
Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation.*

74 OPTICS 2501
Includes light phenomena.

75 PLASMA PHYSICS 2503
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics.* For space plasmas see *90 Astrophysics.*

76 SOLID-STATE PHYSICS 2505
Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

77 THERMODYNAMICS AND STATISTICAL PHYSICS 2508
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) **N.A.**
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT **2508**
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE **2509**
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS **2511**
Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE **2511**
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION **2511**
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) **N.A.**

89 ASTRONOMY **2512**
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS **2512**
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **2513**
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **2514**
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **2514**
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

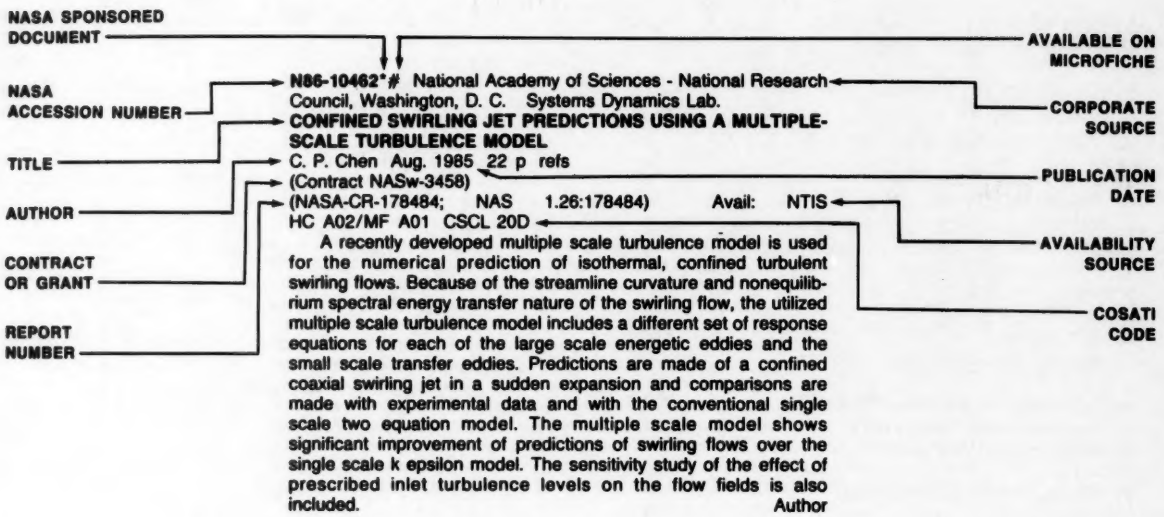
GENERAL

99 GENERAL **2514**

Note: N.A. means that no abstracts were assigned to this category for this issue.

SUBJECT INDEX **I-1**
PERSONAL AUTHOR INDEX **I-57**
CORPORATE SOURCE INDEX **I-63**
CONTRACT NUMBER INDEX **I-73**
REPORT/ACCESSION NUMBER INDEX **I-75**

TYPICAL CITATION AND ABSTRACT


NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
N86-10462*# National Academy of Sciences - National Research Council, Washington, D. C. Systems Dynamics Lab.
CORPORATE SOURCE
TITLE
CONFINED SWIRLING JET PREDICTIONS USING A MULTIPLE-SCALE TURBULENCE MODEL
AUTHOR
C. P. Chen Aug. 1985 22 p refs
PUBLICATION DATE
CONTRACT OR GRANT
(Contract NASw-3458)
REPORT NUMBER
(NASA-CR-178484; NAS 1.26:178484) Avail: NTIS
AVAILABILITY SOURCE
HC A02/MF A01 CSCL 20D
COSATI CODE
A recently developed multiple scale turbulence model is used for the numerical prediction of isothermal, confined turbulent swirling flows. Because of the streamline curvature and nonequilibrium spectral energy transfer nature of the swirling flow, the utilized multiple scale turbulence model includes a different set of response equations for each of the large scale energetic eddies and the small scale transfer eddies. Predictions are made of a confined coaxial swirling jet in a sudden expansion and comparisons are made with experimental data and with the conventional single scale two equation model. The multiple scale model shows significant improvement of predictions of swirling flows over the single scale k epsilon model. The sensitivity study of the effect of prescribed inlet turbulence levels on the flow fields is also included.
Author

VOLUME 24 NUMBER 15 / AUGUST 8, 1986

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N86-24652# National Aeronautics and Space Administration, Washington, D.C.
SELECTIONS FROM FLUG REVUE UND FLUGWELT INTERNATIONAL. A. ON THE BORDER OF TIME-HYPERSONIC FLIGHT. B. NASA PROGRAMS PAVE THE WAY FOR THE HYPERSONIC AIRCRAFT. C. SHUTTLE FLIGHT 61-B; CONSTRUCTION IN SPACE. D. FASTER THAN A BULLET; HYPERSONIC MILITARY AIRCRAFT
H. Penner, K. Mueller, H. Muller, G. Wange, and N. Lynn May 1986 40 p Transl. into ENGLISH of Flug Revue and Flugwelt International (West Germany), Feb. 1986 p 9-22 and 46-50 Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-4004)
(NASA-TM-88418; NAS 1.15:88418) Avail: NTIS HC A03/MF A01 CSCL 01B

Planned research and future developments in hypersonic aircraft, including possible military applications of hypersonic transport aircraft are discussed. NASA's development of hypersonic aircraft is discussed. Other topics include an overview of the 61-B Space Shuttle mission that pertains to the construction of space structures. Author

N86-24653 National Aeronautics and Space Administration, Washington, D.C.
AERONAUTICAL ENGINEERING: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 199)
Apr. 1986 121 p
(NASA-SP-7037(199); NAS 1.21:7037(199)) Avail: NTIS HC A06 CSCL 01A

This bibliography lists 428 reports, articles, and other documents introduced into the NASA scientific and technical information system in March 1986. Author

N86-24654# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
OUR WINGS A01
31 Dec. 1985 44 p
(AD-A163608; FTD-ID(RS)T-0173-85) Avail: NTIS HC A03/MF A01 CSCL 01/3

This article on the history of Soviet aviation is taken from an August 1970 issue of Sovetsky Voin. Several Russian aviators and scientists are interviewed. Conversations cover such categories as aerial combat,aircraft construction from 1921, types of aircraft, and the role of the Soviet government in aviation and the space program. GRA

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N86-24655 Princeton Univ., N. J.
NUMERICAL SOLUTION OF THE EULER EQUATIONS BY IMPLICIT SCHEMES WITH MULTIPLE GRIDS Ph.D. Thesis
Seokkwan Yoon 1985 134 p
Avail: Univ. Microfilms Order No. DA8529050

Three implicit schemes for solving the Euler equations are described. New implicit dissipation models are developed to improve the high frequency damping characteristics of the Alternating Direction Implicit scheme. The convergence and the accuracy of the LU implicit scheme are enhanced by the use of effective spectral radii and by splitting the computational domain. It is shown that a symmetric successive over-relaxation method for solving the unfactored implicit scheme is equivalent to a modified form of the LU implicit scheme. A multigrid method is developed for implicit schemes to produce rapidly convergent algorithms for calculating steady state solutions of the Euler equations for transonic flows. The number of time steps required to reach a steady state is reduced by an order of magnitude by the introduction of multiple grids. The LU implicit scheme is found to be promising for three-dimensional and unsteady flow calculations and two-dimensional steady flow analysis. Dissert. Abstr.

N86-24656 British Library Lending Div., Boston Spa (England).
AERODYNAMIC CHARACTERISTICS OF GAS CUSHION FOR CYLINDERS
A. A. Ionin, V. I. Sobolev, V. Yu. Starov, A. G. Klevtsov, and M. A. Buz 1986 9 p ref Transl. into ENGLISH from Izvestiya VUZ Chernaya Metall. (USSR), no. 9, 1985 p 133-137
(BLL-M-36671-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The rules governing the formation of a gas cushion under cylindrical bodies, such as tubes, were investigated on an isothermal model of an experimental-industrial furnace. The factors investigated included the height of lift of the piece above the grid, the gas pressure before the grid and in the gas cushion itself, the gas flow rate and the grid free cross section. An equation was obtained for the height of lift in terms of the main parameters. The formula can be used for designing gas cushion arrangements for furnaces for different purposes. Author

N86-24657*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
UNSTEADY TRANSONIC FLOW CALCULATIONS FOR WING-FUSELAGE CONFIGURATIONS
John T. Batina Mar. 1986 16 p refs Presented at the 27th AIAA/ASME/ASCE/AHS Structures, Structural Dynamics and Materials Conference, San Antonio, Tex., 19-21 May 1986

(NASA-TM-87707; NAS 1.15:87707; AIAA-86-0862) Avail: NTIS HC A02/MF A01 CSCL 01A

Unsteady transonic flow calculations are presented for wing-fuselage configurations. Calculations are performed by extending the XTRAN3S unsteady transonic small-disturbance code to allow the treatment of a fuselage. Details of the XTRAN3S fuselage modeling are discussed in the context of the small-disturbance equation. Transonic calculations are presented for three wing-fuselage configurations with leading edge sweep angles ranging from 0 deg to 46.76 deg. Simple bending and torsion modal oscillations of the wing are calculated. Sectional lift and moment coefficients for the wing-alone and wing-fuselage cases are compared and the effects of fuselage aerodynamic interference on the unsteady wing loading are revealed. Tabulated generalized aerodynamic forces used in flutter analyses, indicate small changes in the real in-phase component and as much as a 30% change in the imaginary component when the fuselage is included in the calculation. These changes result in a 2 to 5% increase in total magnitude and a several degree increase in phase. E.A.K.

N86-24658*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

A NUMERICAL ANALYSIS APPLIED TO HIGH ANGLE OF ATTACK THREE-DIMENSIONAL INLETS

Danny P. Hwang 1986 16 p refs Presented at the 22nd Joint Propulsion Conference, Huntsville, Ala., 16-18 Jun. 1986; sponsored by AIAA, ASME, SAE, and ASEE

(NASA-TM-87298; E-3004; NAS 1.15:87298; AIAA-86-1627) Avail: NTIS HC A02/MF A01 CSCL 01A

The three-dimensional analytical methods used to analyze subsonic high angle of attack inlets are described. The methods are shown to be in good agreement with experimental results for various three-dimensional high angle of attack inlets. The methods are used to predict aerodynamic characteristics of scarf and slotted-lip inlets. E.A.K.

N86-24659*# Boeing Commercial Airplane Co., Seattle, Wash.

NATURAL LAMINAR FLOW FLIGHT EXPERIMENTS ON A SWEPT WING BUSINESS JET-BOUNDARY LAYER STABILITY ANALYSES Contractor Report, Sep. 1983 - Mar. 1985

Rodger A. Rozendaal May 1986 98 p refs

(Grant NAG1-401)

(NASA-CR-3975; NAS 1.26:3975; D6-53071) Avail: NTIS HC A05/MF A01 CSCL 01A

The linear boundary layer stability analyses and their correlation with data of 18 cases from a natural laminar flow (NLF) flight test program using a Cessna Citation 3 business jet are described. The transition point varied from 5% to 35% chord for these conditions, and both upper and lower wing surfaces were included. Altitude varied from 10,000 to 43,000 ft and Mach number from 0.3 to 0.8. Four cases were at nonzero sideslip. Although there was much scatter in the results, the analyses of boundary layer stability at the 18 conditions led to the conclusion that crossflow instability was the primary cause of transition. However, the sideslip cases did show some interaction of crossflow and Tollmien-Schlichting disturbances. The lower surface showed much lower Tollmien-Schlichting amplification at transition than the upper surface, but similar crossflow amplifications. No relationship between Mach number and disturbance amplification at transition could be found. The quality of these results is open to question from questionable wing surface quality, inadequate density of transition sensors on the wing upper surface, and an unresolved pressure shift in the wing pressure data. The results of this study show the need for careful preparation for transition experiments. Preparation should include flow analyses of the test surface, boundary layer disturbance amplification analyses, and assurance of adequate surface quality in the test area. The placement of necessary instruments and usefulness of the resulting data could largely be determined during the pretest phase. Author

N86-24660*# Computer Sciences Corp., Hampton, Va.

USSAERO VERSION D COMPUTER PROGRAM DEVELOPMENT USING ANSI STANDARD FORTRAN 77 AND DI-3000 GRAPHICS

Michael R. Wiese Washington NASA May 1986 105 p refs (Contract NAS1-17999)

(NASA-CR-3980; NAS 1.26:3980) Avail: NTIS HC A06/MF A01 CSCL 01A

The D version of the Unified Subsonic Supersonic Aerodynamic Analysis (USSAERO) program is the result of numerous modifications and enhancements to the B01 version. These changes include conversion to ANSI standard FORTRAN 77; use of the DI-3000 graphics package; removal of the overlay structure; a revised input format; the addition of an input data analysis routine; and increasing the number of aeronautical components allowed. Author

N86-24661*# Old Dominion Univ., Norfolk, Va.

VAPOR-SCREEN FLOW-VISUALIZATION EXPERIMENTS IN THE NASA LANGLEY 0.3-m TRANSONIC CRYOGENIC TUNNEL Final Report

Gregory Vincent Selby Washington NASA May 1986 38 p refs

(Grant NGT-47-003-029)

(NASA-CR-3984; NAS 1.26:3984) Avail: NTIS HC A03/MF A01 CSCL 01A

The vortical flow on the leeward side of a delta-wing model has been visualized at several different tunnel conditions in the NASA Langley 0.3-Meter Transonic Cryogenic Tunnel using a vapor-screen flow-visualization technique. Vapor-screen photographs of the subject flow field are presented and interpreted relative to phenomenological implications. Results indicate that the use of nitrogen fog in conjunction with the vapor-screen technique is feasibile. Author

N86-24662*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

R4 AIRFOIL DATA CORRECTED FOR SIDEWALL BOUNDARY-LAYER EFFECTS IN THE LANGLEY 0.3-METER TRANSONIC CRYOGENIC TUNNEL

Renaldo V. Jenkins May 1986 114 p refs

(NASA-TP-2565; L-16066; NAS 1.60:2565) Avail: NTIS HC A06/MF A01 CSCL 01A

Corrected aerodynamic data for the R4 airfoil at Mach numbers from 0.60 to 0.78 and angles of attack from -2.0 deg. to 4.5 deg. are presented. The test Reynolds numbers were 4 million, 6 million, 10 million, 15 million, 30 million, and 40 million based on the 152.32-mm chord of the airfoil. Corrections for data were previously published in NASA Technical Memorandum 85739. The design goal of a normal-force coefficient of 0.65 at a Mach number of 0.73 and a Reynolds number of 30 million was successfully obtained with this airfoil. Author

N86-24663*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

NONISENTROPIC UNSTEADY THREE DIMENSIONAL SMALL DISTURBANCE POTENTIAL THEORY

M. D. Gibbons, W. Whitlow, Jr., (Purdue Univ., West Lafayette, Ind.), and M. H. Williams, (Purdue Univ., West Lafayette, Ind.) Apr. 1986 12 p refs Presented at the 27th AIAA/ASME/ASCE/AHS Structures, Structural Dynamics and Materials Conference, San Antonio, Tex., 19-21 May 1986

(Grant NAG1-372)

(NASA-TM-87726; NAS 1.15:87726; AIAA-Paper-86-0863) Avail: NTIS HC A02/MF A01 CSCL 01A

Modifications that allow for more accurate modeling of flow fields when strong shocks are present were made into three dimensional transonic small disturbance (TSD) potential theory. The Engquist-Osher type-dependent differencing was incorporated into the solution algorithm. The modified theory was implemented in the XTRAN3S computer code. Steady flows over a rectangular wing with a constant NACA 0012 airfoil section and an aspect ratio of 12 were calculated for freestream Mach numbers (M) of 0.82, 0.84, and 0.86. The obtained results are compared using the modified and unmodified TSD theories and the results from a three dimensional Euler code are presented. Nonunique solutions

in three dimensions are shown to appear for the rectangular wing as aspect ratio increases. Steady and unsteady results are shown for the RAE tailplane model at M = 0.90. Calculations using unmodified theory, modified theory and experimental data are compared. Author

N86-24664*# United Technologies Corp., East Hartford, Conn.
ALESEP. PART 2: A COMPUTER PROGRAM FOR THE ANALYSIS OF LEADING EDGE SEPARATION BUBBLES ON INFINITE SWEPT WINGS
R. L. Davis 3 Feb. 1986 75 p refs
(Contract NAS1-16585)
(NASA-CR-178015; NAS 1.26:178015) Avail: NTIS HC A04/MF A01 CSCL 01A

A program called ALESEP is presented for the analysis of the inviscid-viscous interaction which occurs due to the presence of a closed laminar-transitional separation bubble on an airfoil or infinite swept wing. The ALESEP code provides an iterative solution of the boundary layer equations expressed in an inverse formulation coupled to a Cauchy integral representation of the inviscid flow. This interaction analysis is treated as a local perturbation to a known solution obtained from a global airfoil analysis; hence, part of the required input to the ALESEP code are the reference displacement thickness and tangential velocity distributions. Special windward differencing may be used in the reversed flow regions of the separation bubble to accurately account for the flow direction in the discretization of the streamwise convection of momentum. The ALESEP code contains a forced transition model based on a streamwise intermittency function, a natural transition model based on a solution of the integral form of the turbulent kinetic energy equation, and an empirical natural transition model. Author

N86-24665*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ROTOR PERFORMANCE CHARACTERISTICS FROM AN AEROACOUSTIC HELICOPTER WIND-TUNNEL TEST PROGRAM
Danny R. Hoad, Joe W. Elliott, and Nettie M. Orie May 1986 99 p refs
(DA Proj. 1L1-62209-AH-76)
(NASA-TM-87661; L-16078; NAS 1.15:87661;
AVSCOM-TM-86-B-1) Avail: NTIS HC A05/MF A01 CSCL 01A

An investigation of helicopter rotor noise at model scale was conducted in the Langley 4 by 7 meter tunnel. The program described was the first of a planned three-phase project whose purpose was to examine the characteristic noise mechanism involved in main rotor/tail rotor interaction noise. This first phase was conducted with a main rotor only, in order to identify the characteristic noise generated by only the main rotor. The aerodynamic operating conditions of the rotor system were defined during the test. The acoustic data were properly referenced. Author

N86-24666# Cranfield Inst. of Tech., Bedford (England). Coll. of Aeronautics.
THE BEHAVIOUR AND PERFORMANCE OF LEADING EDGE VORTEX FLAPS
D. G. Ellis Feb. 1986 79 p refs
(CAR-8601; ISBN-0-947767-34-7) Avail: NTIS HC A05/MF A01

A series of leading edge vortex flaps was studied in subsonic wind tunnel tests to determine the possibility of improving the lift/drag ratio. Various flap sizes and deflection angles, and trailing edge flap effects on leading edge vortex flap behavior were investigated. Lift/drag ratio improvements of more than 2% are found at moderate angles of attack. It is indicated that the vortex flap can improve the efficiency of slender wings when operating in aerodynamic environments which are governed by leading edge separation and flow. E.A.K.

N86-24667*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
IN-FLIGHT MEASUREMENTS OF WING ICE SHAPES AND WING SECTION DRAG INCREASES CAUSED BY NATURAL ICING CONDITIONS
Kevin Mikkelsen, Nikola Juhasz, Richard Ranaudo, Robert McKnight, Robert Freedman, and John Greissing May 1986 27 p refs
(NASA-TM-87301; E-3013; NAS 1.15:87301) Avail: NTIS HC A03/MF A01 CSCL 01A

Aircraft icing flight research was performed in natural icing conditions with a twin engine computer type STOL aircraft. In-flight measurements were made of the icing cloud environment, the shape of the ice accretion on the wing, and the corresponding increase in the wing section drag. Results are presented for three icing encounters. On one flight, the wing section drag coefficient increased 35 percent over the uniced baseline for cruise conditions while a 43 percent increase was observed at an aircraft angle of attack of 6.2 degrees. Author

N86-24668# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
INVESTIGATION OF ROLLING-UP AND INTERACTION OF LEADING-EDGE AND TRAILING-EDGE VORTEX SHEETS ON A SLENDER DELTA WING
Xieyuan Yin, Nan Xia, and Guohua Deng 15 Jan. 1986 24 p refs Transl. into ENGLISH from Lixue Xueboa (China), v. 16, no. 5, Sep. 1984 p 454-462
(AD-A163692; FTD-ID(RS)T-1041-85) Avail: NTIS HC A02/MF A01 CSCL 20/4

The objective of this paper is to establish a simple two-dimensional theoretical model in an attempt to use a computer to numerically simulate the experimental results of Hummel regarding the rolling-up and interaction of the leading-edge and trailing edge vortex sheets on a delta wing. It was found experimentally that when the leading vortex is present the trailing-edge vortex sheet will roll up another vortex downstream from the trailing-edge. Furthermore, the circulation of the leading-edge vortex is opposite in direction to that of the trailing-edge vortex. The numerical results are in good agreement with the experimental pictures. GRA

N86-24669# Texas Univ., Austin. Dept. of Aerospace Eng. and Eng. Mech.
EXPERIMENTAL STUDY OF THE SUPERSONIC TURBULENT BOUNDARY LAYER ON A BLUNTED AXISYMMETRIC BODY Final Report, 1 Aug. 1982 - 31 Jul. 1985
D. S. Dolling 30 Sep. 1985 25 p refs
(Contract DAAG29-84-M-0432)
(AD-A163736; ARO-22362.1-EG) Avail: NTIS HC A02/MF A01 CSCL 20/4

Surface pressure distributions and turbulent boundary layer velocity profiles have been measured on a tangent-ogive cylinder model at small angles of attack (0-4.5 deg) in a high Reynolds number, Mach 3 airflow. The model wall temperature was approximately adiabatic. The measurements were made using pointed, tangent-hemisphere and flat-faced nose tips. The effects of tip blunting on the wind- and leeside velocity profiles, integral thicknesses, shape factor, power law exponent, skin friction coefficient and wake strength parameter are presented. It is shown that the results obtained using different geometry tips can be correlated using a bluntness length-scale obtained by integration of the local tip surface angle from the stagnation point to the point corresponding to shock detachment. GRA

N86-24670# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
USE OF STATE ESTIMATION TO CALCULATE ANGLE-OF-ATTACK POSITION ERROR FROM FLIGHT TEST DATA M.S. Thesis
Thomas H. Thacker Oct. 1985 99 p refs
(AD-A163962; AFIT/GAE/AA/85J-3) Avail: NTIS HC A05/MF A01 CSCL 20/4

This thesis determined the position errors of an aircraft's angle-of-attack (AOA) sensor using state estimation with flight test data. The position errors were caused by local flow and upwash and were found to be a function of AOA and Mach number. The test aircraft used in this project was a T-38A Talon supersonic trainer from the USAF Test Pilot School configured with a Vought

yaw and pitch system noseboom and an internal Aydin-Vector data acquisition system (DAS). The position errors were found by calculating the true AOA using equations of motion and DAS parameters. The data from the DAS were noise corrupted and had to be filtered. This was accomplished using state estimation in a Kalman filter. The estimated AOA was compared to the measured AOA from the noseboom sensor to obtain the position error. Accurate position errors were obtained, even in dynamic maneuvers. This method should be considered in future AOA error testing. The method was accurate enough to identify a hysteresis error in the T-38's AOA sensor of + or - 0.5 degrees, which was confirmed by ground calibration. GRA

N86-24671 Colorado Univ., Boulder.
THE DEVELOPMENT OF VORTICITY AND VORTICES FROM FORCED UNSTEADY FLOW SEPARATION Ph.D. Thesis
Michael Cales Robinson 1985 164 p
Avail: Univ. Microfilms Order No. DA8528519

Much of the new impetus for research into unsteady separated flows has resulted from the potential exploitation of large scale vortices for improving aerodynamic performance. Transient lift and moment coefficients produced by dynamic airfoil motions can be four to five times greater than steady state counterparts. However, before a realistic utilization of unsteady vortical structures is possible, many fundamental questions regarding the physics of vortex initiation and development must be answered. Large scale vortex development induced by forced unsteady flow separation was examined across an extended range of test conditions. Dynamic sinusoidal airfoil oscillations, spanwise vortex generation, and pulsed air injection normal to the airfoil surface were used to produce forced unsteady flow separation. Phase locked multiple exposure photographs in conjunction with hotwire anemometry and multi-port surface pressure measurements documented the development of temporally and spatially synchronous leading and trailing edge vortices. Airfoil motion history was observed to directly influence vortex initiation, development and strength. Much of the new impetus for research into unsteady separated flows has resulted from the potential g forced unsteady flow separation. Dissert. Abstr.

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N86-24672*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LOADS AND MOTIONS OF AN F-106B FLYING THROUGH THUNDERSTORMS
Roger M. Winebarger May 1986 53 p refs
(NASA-TM-87671; L-16014; NAS 1.15:87671) Avail: NTIS HC A04/MF A01 CSCL 01C

Data are presented on loads and motions of a NASA F-106B airplane flying inside thunderstorms. No significant differences in piloting techniques were observed among the three pilots involved. It is indicated that airliners in normal operations occasionally encounter turbulence almost as severe as those encountered in these thunderstorm flights. E A.K.

N86-24673*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ICE DETECTOR Patent Application
Leonard M. Weinstein, inventor (to NASA) Filed 31 Mar. 1986 14 p
(NASA-Case-LAR-13403-1; NAS 1.71:LAR-13403-1; US-Patent-Appl-SN-846429) Avail: NTIS HC A02/MF A01 CSCL 01C

An ice detector for aircraft that can accurately determine the presence and thickness of ice and control devices to remove it is proposed. A small depression on the surface of an aircraft structure is filled with a plastic or epoxy material. Two capacitance gauges and a temperature gauge are embedded in this material near the surface. When moisture forms on the surface the capacitance of each of the gauges changes. This signal combined with the signal from a temperature gauge determines whether the moisture is water or ice. If ice is present its thickness may be measured based on the output of the second capacitance gauge. Once the presence of ice is determined, the thickness is easily determined. The output of the device may be used to provide an indication to the pilot or to automatically control heating elements to remove the ice. Author

N86-24674# Naval Postgraduate School, Monterey, Calif.
APPLICATION OF ARTIFICIAL INTELLIGENCE TO IMPROVE AIRCRAFT SURVIVABILITY M.S. Thesis
William L. Decker Dec. 1985 76 p refs
(AD-A164172; AD-E750890) Avail: NTIS HC A05/MF A01 CSCL 06/4

The hazards associated with the critical flight phases of civil as well as military flight operations can seriously degrade pilot efficiency, and therefore aircraft survivability, if the number or complexity of tasks that the pilot must manage exceeds his/her capabilities. This thesis explores the feasibility of applying artificial intelligence (AI) research to the construction of a Survivability Manager (SM) knowledge based system (KBS) that will assist the pilot by assuming a portion of the survivability task management load. The application of KBS principles to survivability management is illustrated using the normal and emergency management procedures for a hypothetical engine fuel supply system as a working example. Though the SM is not a reality today, there is considerable research in both AI and survivability enhancement studies to draw upon. It is recommended that a prototype be developed using currently available assets to further investigate the feasibility of the Survivability Manager. GRA

N86-24675# National Transportation Safety Board, Washington, D. C.
AIRCRAFT ACCIDENT/INCIDENT SUMMARY REPORTS: DENVER, COLORADO, AUGUST 19, 1983; BLOUNTVILLE, TENNESSEE, JULY 16, 1983; TUCSON, ARIZONA, FEBRUARY 6, 1983, COCKEYSVILLE, MARYLAND, APRIL 28, 1984; AKRON, OHIO, SEPTEMBER 30, 1984; SEATTLE, WASHINGTON, OCTOBER 18, 1984; MIAMI, FLORIDA, NOVEMBER 11, 1983
30 Sep. 1985 63 p
(PB85-910409; NTSB/AAR-85/01/SUM) Avail: NTIS HC A04/MF A01; HC also available on subscription, North American Continent price $60.00, all others write for quote CSCL 13L

Reports of eight separate aircraft accidents investigated by the National Transportation Safety Board are presented. The accident locations and their dates are as follows: Denver, Colorado, August 19, 1983; Blountville, Tennessee, July 16, 1983; Tucson, Arizona, February 6, 1983; Sioux Falls, South Dakota, December 20, 1983; Cockeysville, Maryland, April 28, 1984; Akron, Ohio, September 30, 1984; Seattle, Washington, October 18, 1984; and Miami, Florida, November 11, 1983. A brief containing the probable cause of accident is included for each case. GRA

N86-24676# National Transportation Safety Board, Washington, D. C. Bureau of Technology.
SAFETY STUDY. AIRLINE PASSENGER SAFETY EDUCATION: A REVIEW OF METHODS USED TO PRESENT SAFETY INFORMATION
25 Oct. 1985 157 p
(PB85-917014; NTSB/SS-85/09) Avail: NTIS HC A08/MF A01; also available on subscription, North American continent HC $60.00,—all others write for quote CSCL 03L

The study provides a comprehensive review of accidents, Safety Board recommendations, earlier studies, the chronology of FAA rulemaking actions, and attempts by the industry to improve the passenger safety information. Additionally, the flight attendant oral briefings, demonstrations, safety cards and videotaped

briefings are compared to FAA and industry recommended guidelines to determine how well these guidelines are being followed. The study represents a systematic review and comparison of the four briefing methods and makes subjective observations as to the apparent efficacy of each method. Twelve new recommendations are made to the FAA, and three to the airline industry. Three previous recommendations are reiterated to the FAA. GRA

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N86-24677*# Ohio State Univ., Columbus. ElectroScience Lab.
A STUDY OF A COLLISION AVOIDANCE SYSTEM MOUNTED ON A CURVED GROUND PLANE Semiannual Report
Philip H. Law, W. D. Burnside, and R. G. Rojas Mar. 1986 114 p refs
(Grant NsG-1498)
(NASA-CR-176771; NAS 1.26:176771; Rept-716199-8) Avail: NTIS HC A06/MF A01 CSCL 17G

Research conducted on a traffic advisory and collision avoidance system (TCAS 2) mounted on a curved ground plane is described. It is found that a curved finite ground plane can be used as a good simulation model for the fuselage of an aircraft but may not be good enough to model a whole aircraft due to the shadowing of the vertical stabilizer, wings, etc. The surface curvature of this curved disc significantly affects the monopulse characteristics in the azimuth plane but not as much in the elevation plane. These variations of the monopulse characteristics verify the need of a lookup table for the 64 azimuth beam positions. The best location of a TCAS 2 array on a Boeing 737 is to move it as far from the vertical stabilizer as possible. Author

N86-24678*# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
THE EVALUATION OF THE OSGLR ALGORITHM FOR RESTRUCTURABLE CONTROLS Final Report, Dec. 1985 - Apr. 1986
W. F. Bonnice, E. Wagner, S. R. Hall, and P. Motyka Mar. 1986 177 p refs
(Contract NAS1-17556)
(NASA-CR-178083; NAS 1.26:178083; CSDL-R-1849) Avail: NTIS HC A08/MF A01 CSCL 09B

The detection and isolation of commercial aircraft control surface and actuator failures using the orthogonal series generalized likelihood ratio (OSGLR) test was evaluated. The OSGLR algorithm was chosen as the most promising algorithm based on a preliminary evaluation of three failure detection and isolation (FDI) algorithms (the detection filter, the generalized likelihood ratio test, and the OSGLR test) and a survey of the literature. One difficulty of analytic FDI techniques and the OSGLR algorithm in particular is their sensitivity to modeling errors. Therefore, methods of improving the robustness of the algorithm were examined with the incorporation of age-weighting into the algorithm being the most effective approach, significantly reducing the sensitivity of the algorithm to modeling errors. The steady-state implementation of the algorithm based on a single cruise linear model was evaluated using a nonlinear simulation of a C-130 aircraft. A number of off-nominal no-failure flight conditions including maneuvers, nonzero flap deflections, different turbulence levels and steady winds were tested. Based on the no-failure decision functions produced by off-nominal flight conditions, the failure detection performance at the nominal flight condition was determined. The extension of the algorithm to a wider flight envelope by scheduling the linear models used by the algorithm on dynamic pressure and flap deflection was also considered. Since simply scheduling the linear models over the entire flight envelope is unlikely to be adequate, scheduling of the steady-state implentation of the algorithm was briefly investigated. Author

N86-24679# Cranfield Inst. of Tech., Bedford (England). Coll. of Aeronautics.
PRESSURE BASED SEPARATION IN THE UPPER AIRSPACE
M. E. Eshelby Feb. 1986 13 p
(CAR-8614; ISBN-0-947767-39-8) Avail: NTIS HC A02/MF A01

The vertical separation between aircraft above FL290 is 2000 ft which imposes a severe restriction on operations in the upper airspace. The possibility of reducing separations to 1000 ft has been discussed for many years but does not appear to be possible if current altimetry methods are used. The use of atmospheric pressure is proposed as the means of providing upper airspace separation. Current technology in altimetry would be adequate to enable separations based on pressure differentials to be used which allow a 50% increase in airspace utilization FL290 and FL350. The implementation cost of such a system is minimal. Author

N86-24680# Transportation Systems Center, Cambridge, Mass.
RELIABILITY OF NAVIGATION SERVICE PROVIDED BY THE GLOBAL POSITIONING SYSTEM Final Report, Dec. 1983 - Nov. 1984
Rudolph M. Kalafus May 1985 73 p refs
(AD-A163541; DOT-TSC-FAA-85-4; FAA/ES-85/4) Avail: NTIS HC A04/MF A01 CSCL 17/7

The planned NAVSTAR/GPS satellite constellation of 18 satellites plus 3 active will provide excellent coverage over the continental United States (CONUS) if all are operating properly. This report examines the coverage under conditions of one satellite failure. It turns out that the failure of any satellite results in service outages of up to half an hour somewhere in the CONUS. While altimeter aiding eliminates most of these outages, still remain 14 outage events each day. Furthermore, coasting the navigation solution with a stable clock is not effective in handling these outages. One technique which does appear to be effective is using a mask angle of 5 degrees or less. At these low angles the signal is down in amplitude due to antenna rolloff, and it is more affected by tropospheric refraction and multipath, but it is better to use even a corrupted signal than to suffer a service outage. Also examined in this report is the impact of adding satellites to the constellation. It is shown that a 24-satellite consellation still provides 100% availability in the CONUS when one satellite fails. GRA

N86-24681# Federal Aviation Agency, Atlantic City, N.J.
COMPUTED CENTERLINE MLS (MICROWAVE LANDING SYSTEM) APPROACH DEMONSTRATION AT WASHINGTON NATIONAL AIRPORT
James H. Remer Oct. 1985 42 p refs
(AD-A163722; DOT/FAA/CT-TN85/63) Avail: NTIS HC A03/MF A01 CSCL 17/7

This report describes the Computed Centerline Microwave Landing System (MLS) Approach Demonstration Project at the Washington National Airport. The purpose of this project was to demonstrate the capability of generating and flying a computed centerline approach for a nonstandard MLS siting. Specifically, the system which was developed enables final approaches to be made to runways which have azimuth units offset from the runway centerline. This system was successfully flight tested at the Federal Aviation Administration (FAA) Technical Center, Atlantic City Airport, NJ, and at the Washington National Airport. Runway 33 was used at Washington, with its MLS azimuth unit situated 275 feet to the right of the centerline. Conclusions derived from this project indicate that computed centerline approaches are indeed feasible. Precautions must be taken however, to properly tailor the course width. Site geometry and minima also impact system performance. In addition to the flight test data plots, the report contains system hardware and software design data. GRA

N86-24682# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
GYRO AND ACCELEROMETER BASED NAVIGATION SYSTEM FOR A MOBILE AUTONOMOUS ROBOT Final Report, Jan. - Dec. 1985
Roland J. Bloom and William J. Ramey, Jr. 2 Dec. 1985 254 p refs
(AD-A164036; AFIT/GA/GE/ENG/85D-33) Avail: NTIS HC A12/MF A01 CSCL 17/7

A navigation system for a mobile autonomous robot is presented. The navigation system is based on a directional gyroscope and a single axis accelerometer which enables a robot to navigate independent of wheel optical shaft encoders and other commonly used positioning apparatus. The computer controlled navigation system is capable of providing absolute heading, heading rate (angular velocity), and linear velocity to a user computer. These data from the navigation system (heading and velocity) are used to compute the present location of the robot. In addition, the heading data is used to form a closed loop feedback control system for maintaining the robot on a desired course. The navigation system was designed specifically for application on an existing Air Force Institute of Technology (AFIT) robot; however, it could be easily adapted to any robot system with a standard IEEE RS-232 serial communication interface. Test results are provided which demonstrate the use of closed loop heading control on the AFIT robot and which identify problems associated with the use of an accelerometer system for distance measurement. This thesis includes all schematics, parts lists, software listings, and operating instructions for the navigation system. A new robot world modeling and path planning. technique is also presented. GRA

N86-24683# Transportation Systems Center, Cambridge, Mass.
TEST RESULTS FOR DEVELOPING REVISED LORAN-C PROTECTION CRITERIA AD-A164139 DOT-TSC-CG-85-4 DOT-CG-N-1-86 HC A04/MF A01 Final Report, Aug. - Oct. 1984
F. W. Mooney, W. L. Polhemus, and Martin C. Poppe, Jr. Nov. 1985 58 p refs
(Grant DTRS-83-C-00029)
(AD-A164139; DOT-TSC-CG-85-4; DOT-CG-N-1-86) Avail: NTIS HC A04/MF A01 CSCL 17/7

This report presents the results obtained from a series of tests and related analyses studying the effect of harmful RF interference on LORAN-C receivers. The effects of interference in the 70 to 130 kHz band on typical LORAN-C receivers were assessed. Recommendations were developed for signal-to-interference ratios and protection boundaries that would permit proper receiver operation during conditions of interference. GRA

N86-24684# Naval Postgraduate School, Monterey, Calif.
RELATIVE POSITIONING OF OCEAN BOTTOM BENCHMARKS AD-A164177 HC A05/MF A01 M.S. Thesis
Feng-Yu Kuo Dec. 1985 77 p refs
(AD-A164177) Avail: NTIS HC A05/MF A01 CSCL 17/7

A sea floor benchmark experiment was conducted in an area about 16 nmi west of Pt. Lobos, California (36 degrees 30 min N x 122 degrees 17 min W) during 18-22 May 1985. Two baseline-crossing methods were used to determine the relative positions of acoustic bottom transponders. The method of least-squares adjustment was used to analyze the data. Relative position determination of the transponder array is discussed and recommendations are made for further improvement. The advantage of these methods is their simplicity. Their disadvantage is the relatively large amount of ship time they require to achieve acceptable accuracies. Transponder arrays such as the one deployed can be used for solving many types of problems in sea floor engineering, which will be of increasing importance in the future. Author (GRA)

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.
For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N86-24685*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
GROUND VIBRATION TEST OF AN F-16 AIRPLANE WITH MODIFIED DECOUPLER PYLONS
F. W. Cazier, Jr.. and M. W. Kehoe (NASA. Dryden Flight Research Center) Apr. 1986 64 p refs
(NASA-TM-87634; L-16065; NAS 1.15:87634) Avail: NTIS HC A04/MF A01 CSCL 01C

The decoupler pylon is a passive wing/store flutter suppression device. It was modified to reduce friction following initial flight tests. A ground vibration test was conducted on an F-16 aircraft loaded on each wing with a one-half-full (center bay empty) 370-gallon fuel tank mounted on a standard pylon, a GBU-8 store mounted on the decoupler pylon, and an AIM-9J missile mounted on a wingtip launcher. The test was conducted prior to flight tests with the modified pylon to determine modal frequencies, mode shapes, and structural damping coefficients. Data presented include frequency response plots, mode shape plots, and limited force-effect plots. Author

N86-24686*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STRUCTURAL OPTIMIZATION BY GENERALIZED, MULTILEVEL DECOMPOSITION
J. Sobieszczanski-Sobieski, B. B. James, and M. F. Riley Oct. 1985 19 p refs Prepared in cooperation with Kentron International, Inc., Hampton, Va.
(NASA-TM-87605; NAS 1.15:87605) Avail: NTIS HC A02/MF A01 CSCL 01C

The developments toward a general multilevel optimization capability and results for a three-level structural optimization are described. The method partitions a structure into a number of substructuring levels where each substructure corresponds to a subsystem in the general case of an engineering system. The method is illustrated by a portal framework that decomposes into individual beams. Each beam is a box that can be further decomposed into stiffened plates. Substructuring for this example spans three different levels: (1) the bottom level of finite elements representing the plates; (2) an intermediate level of beams treated as substructures; and (3) the top level for the assembled structure. The three-level case is now considered to be qualitatively complete. E.A.K.

N86-24687*# National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.
AN ENGINEERING APPROACH TO THE USE OF EXPERT SYSTEMS TECHNOLOGY IN AVIONICS APPLICATIONS
Eugene L. Duke, Victoria A. Regenie, Marylouise Brazee, and Randal W. Brumbaugh (PRC Kentron, Edwards, Calif.) May 1986 12 p refs Presented at the IEEE National Aerospace and Electronics Conference (NAECON), Dayton, Ohio, 19-23 May 1986
(NASA-TM-88263; H-1364; NAS 1.15:88263) Avail: NTIS HC A02/MF A01 CSCL 01D

The concept of using a knowledge compiler to transform the knowledge base and inference mechanism of an expert system into a conventional program is presented. The need to accommodate real-time systems requirements in applications such as embedded avionics is outlined. Expert systems and a brief comparison of expert systems and conventional programs are reviewed. Avionics applications of expert systems are discussed before the discussions of applying the proposed concept to example systems using forward and backward chaining. Author

N86-24688# Boeing Military Airplane Development, Seattle, Wash.
FIREPROOF HYDRAULIC BRAKE SYSTEM Final Report, 1 Jul. 1983 - 31 Jul. 1985
Don W. Huling and Floyd H. Hillman Oct. 1985 318 p refs
(Contract F33615-83-C-2322)
(AD-A163542; AFWAL-TR-85-2072) Avail: NTIS HC A14/MF A01 CSCL 01/3

The design, development, and manufacture of a flightworthy two-fluid fireproof hydraulic brake system (FHBS) kit for flight testing on a C/KC-135 has been accomplished. The results of system concepts trade studies, the concept selection procedure and rational, component and system design analyses, and component and system testing are summarized herein. The FHBS design selected is a two-fluid concept that uses nonflammable chlorotrifluoroethylene (CTFE) in the high fire-potential area of the brake and landing gear area. The barrier between the CTFE fluid and the MIL-H-5606 hydraulic fluid is a new component; a reservoir/separator. Based on the analysis and laboratory testing, it was concluded that the FHBS design is both flightworthy and has braking performance equivalent to the C/KC-135 brake system for runway/tire friction coefficients of 0.2 to 0.5. It is recommended that the FHBS kit be installed on a C/KC-135 and flight testing be accomplished. Recommendations regarding test conditions and instrumentation for flight testing are included. GRA

N86-24689# Department of the Air Force, Washington, D.C.
FRAMELESS TRANSPARENCIES FOR AIRCRAFT COCKPIT ENCLOSURES Patent Application
William R. Pinnell, inventor (to Air Force) Filed 4 Dec. 1985 18 p refs
(AD-D012155; US-Patent-Appl-SN-805008) Avail: NTIS HC A02/MF A01 CSCL 01/3

This patent application is for a frameless aircraft cockpit enclosure comprising transparent panels of polycarbonate or other plastics of varying thickness and material properties. The edges of the transparent panels are made thicker than the rest of the panels to engage aircraft canopy and windshield arch sections and aircraft sill structures to thus eliminate prior art frames and edge reinforcements. Fibers may be embedded in the thicker edges to add strength. The material properties of the transparent panel may be varied to provide higher static load strength near aircraft sill structures and higher dynamic load strength and plastic behavior near the center of a canopy where bird impact may occur. The material properties of the panel may also be varied to minimize over a pilot's head or near aircraft critical equipment the amplitude of a flexure wave in an aircraft transparency resulting from a bird impact. Direct forming methods, such as injection molding, are discussed as a means for making the frameless aircraft transparencies. GRA

N86-24690# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
EXPERIMENTAL ASSESSMENT OF VORTEX RETAINING CAVITY FLAPS FOR MANEUVERABILITY IMPROVEMENT ON DELTA WING FIGHTER AIRCRAFT M.S. Thesis
Huland C. Smith Dec. 1985 244 p refs
(AD-A164104; AFIT/GAE/AA/85D-13) Avail: NTIS HC A11/MF A01 CSCL 01/3

An experimental study was conducted to determine the effectiveness of cavity flaps on delta wing aircraft maneuverability. Cavity flaps are conformal control surfaces deployed in the apex region on the wing's lower surface. A 60 degree swept delta wing model was built and tested in the Air Force Institute of Technology five-foot diameter, subsonic wind tunnel. Ten different cavity flap configurations were tested at deflection angles ranging from 30 degrees to 90 degrees for both asymmetric and symmetric deployments. Coefficients of aerodynamic forces and moments versus angle of attack along with the lift to drag ratio versus lift coefficient and the drag polar were plotted for each flap configuration. The changes to the aerodynamic coefficients produced by adding the cavity flaps were also plotted. Results indicate that for longitudinal, lateral and directional maneuverability, the best cavity flap deflection angle will vary depending on the desired response. Data results also indicated it is best not to have the cavity flap hinge line located along or parallel to the fuselage for rolling and pitching moment considerations. Hinge Line Sweep. GRA

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N86-24691*# John Carroll Univ., Cleveland, Ohio. Dept. of Physics.
TIME DOMAIN REFERENCING IN INTENSITY MODULATION FIBER OPTIC SENSING SYSTEMS Final Report
Grigory Adamovsky Apr. 1986 9 p refs Presented at 1986 Quebec Symposium on Optical and Optoelectronics Applied Sciences and Engineering, Quebec, Ontario, 2-6 Jun. 1986; sponsored by Society of Photo-Optical Instrumentation Engineers
(Grant NAG3-366)
(NASA-CR-175109; E-3049; NAS 1.26:175109) Avail: NTIS HC A02/MF A01 CSCL 01D

Intensity modulation sensors are classified depending on the way in which the reference and signal channels are separated: in space, wavelength (frequency), or time domains. To implement the time domain referencing different types of fiber optic (FO) loops have been used. A pulse of short duration sent into the loop results in a series of pulses of different amplitudes. The information about the measured parameter is retrieved from the relative amplitudes of pulses in the same train. Author

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N86-24692# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
PROPULSION AND ENERGETICS PANEL WORKING GROUP 14 ON SUITABLE AVERAGING TECHNIQUES IN NON-UNIFORM INTERNAL FLOWS [PANEL DE PROPULSION ET D'ENERGETIQUE GROUPE DE TRAVAIL 14 METHODES D'ESTABLISSEMENT DE CARACTERISTIQUES MOYENNES DANS LES ECOULEMENTS INTERNES HETEROGENES]
M. Pianko, ed. and F. Wazelt, ed. (Technische Hochschule, Darmstadt, West Germany) Loughton, England Aug. 1983 183 p refs In FRENCH; ENGLISH summary
(AD-A133968; AGARD-AR-182(FR); ISBN-92-835-2110-2) Avail: NTIS HC A09/MF A01 CSCL 21/5

The averaging techniques used for nonuniform internal flow of gas turbine systems, in which the actual flows are usually heterogeneous and three-dimensional was studied. The test analysis and performance prediction methods are based upon simple one-dimensional models. Current practices were reviewed and a theoretical analysis of the relations which may be correctly applied to steady flow was undertaken and known averaging methods were classified. Refinements to known methods and a new approach to averaging for use with engine components and propulsion system analysis are proposed. A variety of possible averaging techniques are identified and compared by preparing a number of sample calculations in ducted flows, turbojet components and a complete propulsion system. The merits and the limitations of the methods studied are outlined. One method is recommended for stagnation temperature averaging. E.A.K.

N86-24693*# United Technologies Research Center, East Hartford, Conn.
ADVANCED TURBOPROP VIBRATORY CHARACTERISTICS Final Report
A. V. Srinivasan and G. B. Fulton Apr. 1984 104 p refs
(Contract NAS3-23533)
(NASA-CR-174708; NAS 1.26:174708; R84-956627-1) Avail: NTIS HC A06/MF A01 CSCL 21E

The assembly of SR5 advanced turboprop blades to develop a structural dynamic data base for swept props is reported. Steady state blade deformation under centrifugal loading and vibratory characteristics of the rotor assembly were measured. Vibration was induced through a system of piezoelectric crystals attached to the blades. Data reduction procedures are used to provide deformation, mode shape, and frequencies of the assembly at predetermined speeds. Author

N86-24694*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LOW-SPEED PERFORMANCE OF AN AXISYMMETRIC, MIXED-COMPRESSION, SUPERSONIC INLET WITH AUXILIARY INLETS
Charles J. Trefny and Joseph W. Wasserbauer Feb. 1986 63 p refs
(NASA-TP-2557; E-2771; NAS 1.60:2557) Avail: NTIS HC A04/MF A01 CSCL 21E

A test program was conducted to determine the aerodynamic performance and acoustic characteristics associated with the low-speed operation of a supersonic, axisymmetric, mixed-compression inlet with auxiliary inlets. Blow-in-auxiliary doors were installed on the NASA Ames P inlet. One door per quadrant was located on the cowl in the subsonic diffuser selection of the inlet. Auxiliary inlets with areas of 20 and 40 percent of the inlet capture area were tested statically and at free-stream Mach numbers of 0.1 and 0.2. The effects of boundary layer bleed inflow were investigated. A JT8D fan simulator driven by compressed air was used to pump inlet flow and to provide a characteristic noise signature. Baseline data were obtained at static free-stream conditions with the sharp P-inlet cowl lip replaced by a blunt lip. Auxiliary inlets increased overall total pressure recovery of the order of 10 percent. Author

N86-24695*# Beech Aircraft Corp., Wichita, Kans.
EVALUATION OF PROPFAN PROPULSION APPLIED TO GENERAL AVIATION
Randal W. Awker Dec. 1985 146 p refs
(Contract NAS3-24349)
(NASA-CR-175020; NAS 1.26:175020) Avail: NTIS HC A07/MF A01 CSCL 21E

Propfan propulsion on business aircraft was evaluated. Comparisons, in terms of cost and performance, were made between propfan propulsion systems and conventional turbofan propulsion systems on a typical business aircraft. In addition, configuration and cost sensitivity studies were conducted to further assess the potential of propfan propulsion. Author

N86-24696# Federal Aviation Administration, Washington, D.C.
EVALUATING TURBINE ENGINE OPERATING CHARACTERISTICS
19 Mar. 1986 10 p
(FAA-AC-25.939-1) Avail: NTIS HC A02/MF A01

Guidelines for the evaluation of turbine engine (turbojet, turboprop, and turboshaft) operating characteristics for subsonic transport category aircraft are provided. The guidelines describe a method of demonstrating compliance with the applicable airworthiness requirements. Like all advisory circular material, these guidelines are not mandatory and do not constitute a regulation. Derived from Federal Aviation Administration experience in establishing compliance with the airworthiness requirements, they represent the means and methods found to be acceptable to all aircraft designs. Each design should be examined to determine whether the suggested methods of evaluation are adequate or if other methods in addition to these may be appropriate. Author

N86-24697*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A REAL-TIME SIMULATION EVALUATION OF AN ADVANCED DETECTION, ISOLATION AND ACCOMMODATION ALGORITHM FOR SENSOR FAILURES IN TURBINE ENGINES
Walter C. Merrill and John C. DeLaat 1986 17 p refs Presented at the American Control Conference, Seattle, Wash., 18-20 Jun. 1986; sponsored by IEEE
(NASA-TM-87289; E-2995; NAS 1.15:87289) Avail: NTIS HC A02/MF A01 CSCL 21E

An advanced sensor failure detection, isolation, and accommodation (ADIA) algorithm has been developed for use with an aircraft turbofan engine control system. In a previous paper the authors described the ADIA algorithm and its real-time implementation. Subsequent improvements made to the algorithm and implementation are discussed, and the results of an evaluation presented. The evaluation used a real-time, hybrid computer simulation of an F100 turbofan engine. Author

N86-24698 Department of the Air Force, Washington, D.C.
ONE-PIECE HPTR BLADE SQUEALER TIP Patent
Richard L. Horvath, inventor (to Air Force) Issued 10 Sep. 1985 4 p
(AD-D012003; US-Patent-4,540,339; US-Patent-Appl-SN-616380; US-Patent-Class-416-92) Avail: US Patent and Trademark Office CSCL 21/5

An improved high pressure turbine rotor blade and tip cap structure is provided which comprises a tip end closure for the blade bonded to the end wall of the blade casting. It includes a base plate member and a pair of upstanding side walls defining a peripheral contour coincidental with and faired to the cambered side walls of the casting. The base plate member has a plurality of radially outwardly opening passageways through it and disposed along the chord of the blade and communicating with a channel included in the radially outwardly facing surface of the casting along a chord of the blade. The passageways are disposed along axes at angles to the base plate whereby coolant fluid flowing through it is directed against the tip side wall surfaces. An opening is provided through the end wall of the casting in the form of a slit or a plurality of holes along the chord of the blade and intersecting the channel, to define an outlet through the end wall for passage of coolant fluid through the blade. GRA

N86-24699# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
TWO-DIMENSIONAL CONFINED JET THRUST VECTOR CONTROL WITH FLOW VISUALIZATION AND VARIABLE FLOW GEOMETRY M.S. Thesis
James W. Cates Dec. 1985 68 p refs
(AD-A164214; AFIT/GAE/AA/85D-2) Avail: NTIS HC A04/MF A01 CSCL 21/5

In this experimental investigation, the performance parameters considered were axial force, side force, and vector angle. Variables included primary pressure, exit-to-throat area ratio, and exit-to-throat axial length. With each test configuration, it was possible to define specific operating modes where the flow was oscillatory, vectored/switchable, and vectored/unswitchable. Only one test configuration yielded a stable axial flow on which secondary injection could be used to study vectoring. Switchable flows existed only at low pressure below the range of test pressures making it impossible to study switching characteristics. Because the flows were attached over the entire range of test pressures, geometric effects were based on the study of these attached flows. Results indicate that the theoretical equations for predicting wall separation points in unconfined nozzles do not accurately predict the separation points in confined jet nozzles. Small variations in axial length, as examined in this study, had a minimal impact on nozzle performance. Primary pressure and exit-to-throat area ratio have the most significant impact on two-dimensional nozzle performance. GRA

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N86-24700*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SWASHPLATE CONTROL SYSTEM Patent Application
Richard J. Peyran, inventor (to NASA) (Army Aviation Engineering Flight Activity, Edwards AFB, Calif.), Georgene H. Laub, inventor (to NASA) (Army Aviation Engineering Flight Activity, Edwards AFB, Calif.), and H. Andrew Morse, inventor (to NASA) (Army Aviation Engineering Flight Activity, Edwards AFB, Calif.) Filed 31 Mar. 1986 13 p
(NASA-Case-ARC-11633-1; NAS 1.71:ARC-11633-1; US-Patent-Appl-SN-846439) Avail: NTIS HC A02/MF A01 CSCL 01C

A mechanical system to control the position of a rotating swashplate is developed. This system provides independent lateral cyclic, longitudinal cyclic and collective pitch control of a helicopter rotor attached to the swashplate, without use of a mixer box. The system also provides direct, linear readout of cyclic and collective swashplate positions. A swashplate control system has a first gimbal ring pivotally mounted along a longitudinal axis. A second gimbal ring is pivotally attached to the first gimbal ring along a lateral axis. A longitudinal cyclic actuator pivots the first gimbal ring along the longitudinal axis. A lateral cyclic actuator pivots the second gimbal ring along the lateral axis. The lateral cyclic actuator is mounted on the first gimbal ring. A swashplate is rotatably mounted on the second gimbal ring. Prior swashplate control systems required use of a mixer box to provide true decoupling of lateral and longitudinal cyclic input to the swashplate. Author

N86-24701# National Aeronautics and Space Administration, Washington, D.C.
EIGENSTRUCTURE ASSIGNMENT AND ITS APPLICATION IN DESIGN OF FLIGHT CONTROL SYSTEMS
Zheng Geng and Daoli Fu May 1986 15 p refs Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-4004)
(NASA-TM-88411; NAS 1.15:88411) Avail: NTIS HC A02/MF A01 CSCL 01C

The present paper is concerned with an extension of the basic concept and the algorithm of eigenstructure assignment. A general conclusion is drawn regarding the assignment of freedoms in the case of the eigenstructure, taking into account a completely controllable linear time-invariant system. The new algorithms are provided for assigning the eigenstructure with multiple eigenvalues and/or with complex conjugate eigenvalues. The application of the eigenstructure assignment method to the design of a flight control system is illustrated with the aid of a numerical example involving an aircraft flight control system. Author

N86-24702*# Georgetown Univ., Washington, D.C. School of Engineering and Applied Science.
A RESEARCH PROGRAM IN ACTIVE CONTROL/AEROELASTICITY Final Semiannual Status Report, May - Oct. 1985
Oct. 1985 15 p
(Grant NAG1-199)
(NASA-CR-176773; NAS 1.26:176773) Avail: NTIS HC A02/MF A01 CSCL 01C

In this research period a synthesis methodology for multifunctional robust aeroservoelastic systems was developed. The development consisted of the following stages: (1) development of an universal diagram to determine phase and gain margins of a multi-input multi-output (MIMO) system using singular value based stability margin criteria; (2) determination of singular value gradients with respect to design parameters and their application to improve stability margins of multiloop system; and (3) application of constrained optimization techniques to synthesize a low order robust controller for a high order MIMO aeroservoelastic system while satisfying several design constraints on the dynamic loads and responses and stability margins at the plant input and output. Overall research activities are summarized. Author

N86-24703*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LATERAL AND LONGITUDINAL AERODYNAMIC STABILITY AND CONTROL PARAMETERS OF THE BASIC VORTEX FLAP RESEARCH AIRCRAFT AS DETERMINED FROM FLIGHT TEST DATA
William T. Suit and James G. Batterson Apr. 1986 38 p
(NASA-TM-87711; NAS 1.15:87711) Avail: NTIS HC A03/MF A01 CSCL 01C

The aerodynamics of the basic F-106B were determined at selected points in the flight envelope. The test aircraft and flight procedures were presented. Aircraft instrumentation and the data system were discussed. The parameter extraction procedure was presented along with a discussion of the test flight results. The results were used to predict the aircraft motions for maneuvers that were not used to determine the vehicle aerodynamics. The control inputs used to maneuver the aircraft to get data for the determination of the aerodynamic parameters were discussed in the flight test procedures. The results from the current flight tests were compared with the results from wind tunnel test of the basic F-106B. B.G.

N86-24704*# Systems Technology, Inc., Hawthorne, Calif.
SPACE SHUTTLE FLYING QUALITIES CRITERIA ASSESSMENT. PHASE 5: DATA ACQUISTION AND ANALYSIS Final Report
T. T. Myers, D. E. Johnston, and D. T. McRuer 1986 136 p refs
(Contract NAS2-11431)
(NASA-CR-166618; NAS 1.26:166618; STI-TR-1206-1) Avail: NTIS HC A07/MF A01 CSCL 01C

The development of flying qualities experiments (OFQ) as a part of the Orbiter Experiments Program (OEX) was continued. The data base was extended to use the ground based cinetheodolite measurements of orbiter approach and landing. Onboard the cinetheodolite data were analyzed from flights STS 2 through 7 to identify the effective augmented vehicle dynamics, the control strategy employed by the pilot during preflare, shallow glide, and final flare segments of the landing, and the key approach and touchdown performance measures. A plan for an OFQ flying qualities data archive and processing is presented. Author

N86-24705# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
EXPERIMENTAL STUDY OF APEX FENCES FOR LIFT ENHANCEMENT ON A HIGHLY SWEPT DELTA WING CONFIGURATION M.S. Thesis
Michael Stuart Dec. 1985 197 p refs
(AD-A163877; AFIT/GAE/AA/85D-14) Avail: NTIS HC A09/MF A01 CSCL 12/1

The longitudinal stability characteristics of a 60 deg. delta wing/body model equipped with various types of apex fences were studied experimentally. The experimental effort used force balance instrumentation and oil flow visualization. The locations of the fence-generated vortices and leading-edge vortices associated with highly swept wings were also determined. Five major fence parameters (shape, surface area, cant, length-to-height, movement) were studied and the results are given in a qualitative analysis. Results indicate a favorable application of apex fences for STOL operations. The fences increase lift and positive pitching moment which dictates the use of trailing edge flaps, further increasing the available maximum lift for takeoff and landing. Accompanying this is a large increase in drag at low angles of attack and a marginal increase at moderate to high angles. The relative strength of nose-down pitching moments at high (above 35 deg.) angles of attack produced by apex fences is slight. Apex fences seem to be a technology whose time may have come. Further research of the lateral behavior of a fenced aircraft appears warranted. GRA

N86-24706# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
MULTIVARIABLE CONTROL LAW DESIGN FOR ENHANCED AIR COMBAT MANEUVERING. F-15/STOL (SHORT TAKE-OFF AND LANDING) DERIVATIVE FIGHTER M.S. Thesis
Kevin A. Sheehan Dec. 1985 378 p refs
(AD-A164017; AFIT/GE/EE/85D-38) Avail: NTIS HC A17/MF A01 CSCL 01/2

Proportional plus integral controllers are designed for the longitudinal mode using a multivariable control law theory developed by Professor Brian Porter of the University of Salford, England. Control laws are formulated by use of a computer-aided multivariable design program entitled MULTI. In addition MULTI performs a digital closed-loop simulation for controller performance analysis. The aircraft model is developed from linearized data. Decoupling of the longitudinal output variables is achieved and demonstrated by four maneuvers (pitch-pointing, vertical translation, direct climb, and constant g pull-up). Plant parameter variation effects are also examined. Destabilizing effects to include actuator and sensor dynamics computational time delay random Gaussian sensor noise and simulation nonlinearities are included. Results show stable responses for all simulations. Except for the most demanding simulations (all destabilizing effects considered), controller responses are smooth and well behaved. Recommendations include proposed future work in thrust vector modeling and suggested improvements to the computer-aided design program, MULTI. GRA

N86-24707# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN LQG UP-AND AWAY FLIGHT CONTROL DESIGN FOR THE STOL F-15 AIRCRAFT M.S. Thesis
Robert A. Houston Dec. 1985 243 p refs
(AD-A164108; AFIT/GE/ENG/85D-21) Avail: NTIS HC A11/MF A01 CSCL 01/4

A robust controller for the STOL F-15 aircraft is developed using the LQG/LTR (linear system model, quadratic cost, Gaussian models of uncertainty used for controller synthesis, with loop transfer recovery techniques of tuning the filter in the loop for control robustness enhancement) methods. Full state feedback controllers are synthesized using CGT/PI (Command Generator Tracking feedforward compensator to provide direct incoporation of flying qualities into the design process, with proportional plus integral feedback control) synthesis, using implicit model following techniques to improve full state robustness characteristics. Finally, a Kalman filter is used to replace the unrealistic assumption of full state availability with estimated states, using a LTR scheme to recover as much full state robustness characteristics as possible. GRA

N86-24708# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
LQG/LTR DESIGN OF A ROBUST FLIGHT CONTROLLER FOR THE STOL F-15 M.S. Thesis
Gregory L. Gross Dec. 1985 182 p refs
(AD-A164111; AFIT/GAE/ENG/85D-1) Avail: NTIS HC A09/MF A01 CSCL 17/7

A robust controller for the approach and landing phase of the Short Take-off and Landing (STOL) F-15 is developed via LQG/LTR (Linear System model, Quadratic cost, Gaussian models of uncertainty, used for controller synthesis, with Loop Transmission Recovery techniques of tuning the filter in the loop for control robustness enhancement) methods. Reduced-order full-state feedback controllers are synthesized using CGT/PT (Command Generator Tracking feedforward compensator to incorporate handling qualities, with Proportional plus Integral feedback) synthesis, specifically using implicit model following to provide good robustness characteristics in the full-state feedback case. The robustness is fully assessed using realistic simulations of the real-world system with meaningful deviations from design conditions. Once a Kalman filter is embedded into the loop to estimate states rather than assuming artificial access to all states, LTR methodology is used to preserve as much robustness as possible. A full assessment of performance and robustness of these final implementable designs is provided. GRA

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N86-24709*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DYNAMIC MEASUREMENT OF TOTAL TEMPERATURE, PRESSURE AND VELOCITY IN THE LANGLEY 0.3-METER TRANSONIC CRYOGENIC TUNNEL
Charles B. Johnson and P. Calvin Stainback May 1986 45 p refs
(NASA-TP-2584; L-16099; NAS 1.60:2584) Avail: NTIS HC A03/MF A01 CSCL 14B

There is theoretical and experimental evidence which indicates that a sudden or step change in the rate at which the liquid nitrogen is injected into the circuit of a cryogenic wind tunnel can cause a temperature front in the flow for several tunnel circuit times. A temperature front, which occurs at intervals equal to the circuit time, is a sudden increase or decrease in the temperature of the flow followed by a nearly constant temperature. Since these fronts can have an effect on the control of the tunnel as well as the time required to establish steady flow conditions in the test section of cryogenic wind tunnel, tests were conducted in the settling chamber in the Langley 0.3-meter Transonic Cryogenic Tunnel (0.3-m TCT) in which high response instrumentation was used to measure the possible existence of these temperature fronts. Three different techniques were used to suddenly change the rate of liquid nitrogen being injected into the tunnel and the results from these three types of tests showed that temperature fronts do not appear to be present in the 0.3-m TCT. Also included are the velocity and pressure fluctuations measured in the settling chamber downstream of the screens and the associated power spectra. Author

N86-24710*# National Aeronautics and Space Administration, Washington, D.C.
WIND TUNNEL TECHNOLOGY FOR THE DEVELOPMENT OF FUTURE COMMERCIAL AIRCRAFT
Joachim Szodruch Mar. 1986 45 p refs Transl. into ENGLISH Conference Paper "Windkanaltechnologie fur die Entwicklung Zukunftiger Verkehrsflugzeuge" Hamburg, West Germany, DGLR Paper 84-127 Presented at the German Aerospace Society Annual Convention, Hamburg, West Germany, 1-3 Oct. 1984 Original language doc. was announced in IAA as A85-40340 Transl. by SCITRAN, Inc., Santa Barbara, Calif. Original doc. prep. by Deutsche Gesellschaft fur Luft- und Raumhafrt
(Contract NASw-4004)
(NASA-TM-88390; NAS 1.15:88390; DGLR-Paper-84-127) Avail: NTIS HC A03/MF A01 CSCL 14B

Requirements for new technologies in the area of civil aircraft design are mainly related to the high cost involved in the purchase of modern, fuel saving aircraft. A second important factor is the long term rise in the price of fuel. The demonstration of the benefits of new technologies, as far as these are related to aerodynamics, will,for the foreseeable future, still be based on wind tunnel measurements. Theoretical computation methods are very successfully used in design work, wing optimization, and an estimation of the Reynolds number effect. However, wind tunnel tests are still needed to verify the feasibility of the considered concepts. Along with other costs, the cost for the wind tunnel tests needed for the development of an aircraft is steadily increasing. The present investigation is concerned with the effect of numerical aerodynamics and civil aircraft technology on the development of wind

tunnels. Attention is given to the requirements for the wind tunnel, investigative methods, measurement technology, models, and the relation between wind tunnel experiments and theoretical methods. F.M.R.

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N86-24711 National Aeronautics and Space Administration, Washington, D.C.
SPACE STATION SYSTEMS: A BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 1)
Mar. 1986 158 p
(NASA-SP-7056(01); NAS 1.21:7056(01)) Avail: NTIS HC A07 CSCL 22A

This bibliography lists 624 reports, articles, and other documents introduced into the NASA scientic and technical information system between January 1, 1985 and June 30, 1985. Its purpose is to provide helpful information to the researcher, manager, and designer in technology development and mission design according to system, interactive analysis and design, structural and thermal analysis and design, structural concepts and control systems, electronics, advanced materials, assembly concepts, propulsion, and solar power satellite systems. The coverage includes documents that define major systems and subsystems, servicing and support requirements, procedures and operations, and missions for the current and future Space Station. Author

N86-24712*# Essex Corp., Huntsville, Ala.
THE GREAT OBSERVATORIES FOR SPACE ASTROPHYSICS
Martin Harwit (Cornell Univ., Ithaca, N.Y.) and Valerie Neal 9 Jan. 1986 51 p Original contains color illustrations
(NASA Order H-78175-B)
(NASA-CR-176754; NAS 1.26:176754) Avail: NTIS HC A04/MF A01 CSCL 22A

Motivated by the ancient urge to observe, measure, compute, and understand the nature of the Universe, the available advanced technology is used to place entire observatories into space for investigations across the spectrum. Stellar evolution, development and nature of the Universe, planetary exploration, technology, NASA's role, and careers in astronomy are displayed. B.G.

N86-24713*# National Aeronautics and Space Administration, Washington, D.C.
TECHNOLOGY FOR LARGE SPACE SYSTEMS: A BIBLIOGRAPHY WITH INDEXES
Mar. 1986 111 p
(NASA-SP-7046(13); NAS 1.21:7046(13)) Avail: NTIS HC A06 CSCL 22A

This bibliography lists 399 reports, articles and other documents introduced into the NASA scientific and technical information system between January 1, 1985 and June 30, 1985. Its purpose is to provide helpful information to the researcher, manager, and designer in technology development and mission design according to system, interactive analysis and design, structural and thermal analysis and design, structural concepts and control systems, electronics, advanced materials, assembly concepts, propulsion, and solar power satellite systems. Author

N86-24714*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RENEWING SOLAR SCIENCE: THE SOLAR MAXIMUM REPAIR MISSION
Valerie Neal 1985 20 p Original contains color illustrations
(NASA-EP-206; NAS 1.19:206) Avail: NTIS HC A02/MF A01; also available from SOD CSCL 22A

The purpose of the Solar Maximum Repair Mission is to restore the operational capacity of the satellite by replacing the attitude control system module and servicing two of the scientific instruments on board. The mission will demonstrate the satellite servicing capacity of the Space Shuttle for the first time. B.G.

N86-24715# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
OVERVIEW OF SPACE TECHNOLOGY
Zhongcheng Yang 15 Jan. 1986 12 p refs Transl. into ENGLISH from Hangkong Zhishi (China), v. 6, no. 11, Nov. 1984 p 14-16
(AD-A163887; FTD-ID(RS)T-1029-85) Avail: NTIS HC A02/MF A01 CSCL 22/1

The history and current status of space technology in the United States, the Soviet Union and other nations are discussed. Topics include standardized design and modularized components and synchronous orbits. GRA

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N86-24716# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
DISTRIBUTED FIFO ALLOCATION OF IDENTICAL RESOURCES USING SMALL SHARED SPACE Technical Report, 1 Apr. 1984 - 30 Nov. 1985
Michael J. Fischer, Nancy A. Lynch, James E. Burns, and Allan Borodin Oct. 1985 38 p refs
(Contract DAAG29-84-K-0058)
(AD-A163988; MIT/LCS/TM-290; ARO-20519.17-EL) Avail: NTIS HC A03/MF A01 CSCL 09/2

A simple and efficient algorithm is presented for the FIFO allocation of K identical resources among asynchronous processes which communicate via shared memory. The algorithm simulates a shared queue but uses exponentially fewer shared memory values, resulting in practical savings of time and space as well as program complexity. The algorithm is robust against processes failure through unannounced stopping, making it attractive also for use in an environment of processes of widely differing speeds. In addition to its practical advantages we show the algorithm is optimal (to within a constant factor) with respect to shared space complexity. GRA

N86-24717# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE DETUMBLING OF AN AXIALLY SYMMETRIC SATELLITE WITH AN ORBITAL MANEUVERING VEHICLE BY NONLINEAR FEEDBACK CONTROL M.S. Thesis
Kirk R. Fleming 13 Dec. 1985 61 p refs
(AD-A163989; AFIT/GA/AA/85D-5) Avail: NTIS HC A04/MF A01 CSCL 22/2

The problem of detumbling a freely spinning and precessing axisymmetric satellite is considered. Detumbling is achieved with another axisymmetric orbital maneuvering vehicle (OMV) joined to the target satellite with a universal joint. The joint provides two rotational degrees of freedom and is translated across the surface of the OMV during the detumbling process. The target satellite and the OMV with its three momentum wheels are modelled as a five body system using Eulerian-based equations of motion developed by Hooker and Margulies. A Liapunov technique is applied to derive a nonlinear feedback control law which drives the system asymptotically to a final spin-stabilized state. State and control histories are presented and indicate that the detumbling process is benign. Constraint force and moment loads at the connection between the OMV and target satellites are also presented, and indicate that no extreme loads are encountered during the despinning and detumbling process. Author (GRA)

N86-24718 Texas Univ., Austin.
A SEMI-ANALYTIC THEORY FOR SATELLITE ORBIT PREDICTION Ph.D. Thesis
Ahmed Hussein Ahmed 1985 181 p
Avail: Univ. Microfilms Order No. DA8527510

A semianalytical theory for satellite orbit prediction was developed. The conservative perturbation affecting the satellite is handled analytically using the Lie-Hori approach, and a numerical version of the method of averaging is used to average the nonconservative perturbation over one revolution of the satellite. The generalized Lie-Hori method and the averaging method are compared. In the comparison the equivalence of the two methods to the second order in the small parameter is shown. However, the approach used can be extended to demonstrate the equivalence for higher orders. To illustrate the equivalance, Duffing's equation, the van der Pol equation, the oscillator with quadratic damping problem, and the oscillator with linear damping problem are solved using each method. The equivalence is used to develop a semi-analytical theory for satellite orbit prediction. The mean element rates are numerically integrated, and the osculating elements are recovered by transforming to the osculating element space. The semianalytical method developed is compared with numerical integration. Dissert. Abstr.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N86-24719*# Lockheed Missiles and Space Co., Huntsville, Ala.
FEASIBILITY STUDY AND VERIFIED DESIGN CONCEPT FOR NEW IMPROVED HOT GAS FACILITY Final Report
7 Feb. 1986 111 p ref
(Contract NAS8-36304)
(NASA-CR-178828; NAS 1.26:178828; LMSC-HEC-TR-D065122) Avail: NTIS HC A06/MF A01 CSCL 14B

The MSFC Hot Gas Facility (HGF) was fabricated in 1975 as a temporary facility to provide immediate turnaround testing to support the SRB and ET TPS development. This facility proved to be very useful and was used to make more than 1300 runs, far more than ever intended in the original design. Therefore, it was in need of constant repair and needed to be replaced with a new improved design to support the continuing SRB/ET TPS product improvement and/or removal efforts. MSFC contracted with Lockheed-Huntsville to work on this improved design through contract NAS8-36304 Feasibility Study and Verified Design Concept for the New Improved Hot Gas Facility. The results of Lockheed-Huntsville's efforts under this contract are summarized. Author

N86-24720*# Dayton Univ., Ohio. Impact Physics Lab.
LASER-PHOTODETECTOR TIMING STATION INSTRUCTION AND MAINTENANCE MANUAL
Edward A. Strader Apr. 1986 13 p refs
(Contract NAS8-36646)
(NASA-CR-178835; NAS 1.26:178835; UDR-TM-86-02) Avail: NTIS HC A02/MF A01 CSCL 14B

A laser photodetector station is used for detecting the arrival of a projectile at a specific point along a ballistic range. The system can be employed on either an open or evacuated range, with small projectiles, and at hypervelocities. The setup procedures, maintenance, and system components are described. B.G.

N86-24721# National Bureau of Standards, Gaithersburg, Md. Center for Radiation Research.
RADIOMETRIC CALIBRATION PROCEDURES USING THE NBS (NATIONAL BUREAU OF STANDARDS) MARBLE ELECTRONICS PACKAGE Final Report
M. E. Mickelson, L. E. Larson, and J. Fowler Sep. 1985 23 p Prepared in cooperation with Denison Univ., Granville, Ohio
(PB86-129756; NBS/TN-1216) Avail: NTIS HC A02/MF]en1] A01; also available SOD HC $1.00 as 003-003-02692-1 CSCL 14B

The National Bureau of Standards MARBLE electonics package, designed to support calibration of radiometric detectors including self-calibration of Si photodiodes, is described. GRA

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N86-24722*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PASSIVE EDDY-CURRENT DAMPING AS A MEANS OF VIBRATION CONTROL IN CRYOGENIC TURBOMACHINERY
Robert E. Cunningham Feb. 1986 14 p refs
(NASA-TP-2562; E-2762; NAS 1.60:2562) Avail: NTIS HC A02/MF A01 CSCL 13I

Lateral shaft vibrations produced by a rotating unbalance weight were damped by means of eddy currents generated in copper conductors that were precessing cyclicly in the gap formed by the pole faces of C-shaped, permanent magnets. The damper assembly, which was located at the lower bearing support of a vertically oriented rotor was completely immersed in liquid nitrogen during the test run. The test rotor was operated over a speed range from 800 to 10,000 rpm. Three magnet/conductor designs were evaluated. Experimental damping coefficients varied from 180 to 530 N sec/m. Reasonable agreement was noted for theoretical values of damping for these same assemblies. Values of damping coefficients varied from 150 to 780 N sec/m. The results demonstrate that passive eddy-current damping is a viable candidate for vibration control in cryogenic turbomachinery. Author

N86-24723# Air Force Accounting and Finance Center, Denver, Colo.
STRATEGIC MISSILE (MINUTEMAN) OPERATING AND SUPPORT COST FACTORS
Michael W. Eaton 20 Sep. 1985 37 p refs Presented at the 19th Annual Dept. of Defense Cost Analysis Symposium, Leesburg, Va., 17-20 Sep. 1985
(AD-A163534) Avail: NTIS HC A03/MF A01 CSCL 16/4

The objective of this special study was to review the spectrum of available cost models and cost studies addressing strategic missiles, evaluate the elements of cost pertaining to operation and support, establish a comprehensive cost element structure to serve as both a standard or checklist in accomplishing cost estimates and the basis from which to develop Air Force cost factors. And finally, actually develop operations and support cost factors for Air Force strategic missiles and make them available to the cost community through publication in AFR 173-13. This paper was presented at the Annual DOD Cost Analysis Symposium. GRA

N86-24724# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
STABILITY OF SPINNING ICBM (INTERCONTINENTAL BALLISTIC MISSILE) IN FIRST STAGE BOOST PHASE M.S. Thesis
Robert W. Bandstra Dec. 1985 111 p refs
(AD-A164019; AFIT/GA/AA/85D-01) Avail: NTIS HC A06/MF A01 CSCL 16/4

A computer program is developed to model a spinning intercontinental Ballistic Missile (IICBM) during the first stage boost phase. The equations of motion are derived and presented and a full rotation matrix is used to show the relationship between a launch-centered, nonrotating earth inertial reference frame and the missile body reference frame. The moments of inertia and aerodynamic forces are derived and presented. A feedback controller is derived which proved to be a necessary additiion to the system in order to reduce the angle of attack. The angle of attack of the missile produced adverse effects on the burnout vector without the feedback controller, but the effects are reduced considerably with the controller included. Problem areas include

possibly excessive nozzle gimbal rates caused by the feedback controller and the need to change the initial kick angle if the missile is spinning in order to achieve the same burnout conditions as a nonspinning missile. Author (GRA)

N86-24725# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

ESTIMATION OF ICBM (INTERCONTINENTAL BALLISTIC MISSILE) PERFORMANCE PARAMETERS M.S. Thesis

Ronald A. Worley Dec. 1985 163 p refs
(AD-A164021; AFIT/GA/AA/85D-10) Avail: NTIS HC A08/MF A01 CSCL 22/2

A Bayes filter was used to estimate launch vehicle performance parameters, and reenter the main Bayes filter to process subsequent stage observation data. The state model consisted of the parameters, and reenter the main Bayes filter to process subsequent stage observation data. The state model consisted of the vehicle position and velocity vectors, the exhaust velocity and the mass ratio. Results indicated that the staging event could be successfully detected by comparing the position of the vehicle as represented by the observation data and the position as represented by the numerical integrator. Exhaust velocity and mass ratio of the next stage could not be estimated independently. The staging estimater state model was then altered to estimate the product of the exhaust velocity and mass ratio. Problems encountered reentering the main Bayes filter were identical to the ones the staging estimator had. It was then determined that there was a possible observability problem with the main algorithm. It was recommended that the main state vector be altered to include the product of the exhaust velocity and mass ratio rather than their independent estimation. GRA

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N86-24726# Presidential Commission on the Space Shuttle Challenger Accident, Washington, D.C.

REPORT OF THE PRESIDENTIAL COMMISSION ON THE SPACE SHUTTLE CHALLENGER ACCIDENT, VOLUME 1

William P. Rogers, Neil A. Armstrong, David C. Acheson, Eugene E. Covert, Richard P. Feynman, Robert B. Hotz, Donald J. Kutyna, Sally K. Ride, Robert W. Rummel, Joseph F. Sutter et al 6 Jun. 1986 260 p refs Original contains color illustrations 5 Vol.
Avail: NTIS MF A01; also available GPO HC $18.00

The findings of the Commission regarding the circumstances surrounding the Challenger accident are reported and recommendations for corrective action are outlined. All available mission data, subsequent tests, and wreckage analyses were reviewed and specific failure scenarios were developed. The Commission concluded that the cause of the Mission 51-L accident was the failure of the pressure seal in the aft field joint of the right solid rocket motor. The failure was due to a faulty design unacceptably sensitive to a number of factors. These factors were the effects of temperature, physical dimensions, the character of materials, the effects of reuse, processing, and the reaction of the joint to dynamic loading. In addition to analyzing the material causes of the accident, the Commission examined the chain of decisions that culminated in approval of the launch. It concluded that the decision making process was flawed in several ways including (1) failure in communication resulting in a launch decision based on incomplete and misleading information, (2) a conflict between engineering data and management judgements, and (3) a NASA management structure that permitted flight safety problems to bypass key Shuttle managers. M.G.

N86-24727# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

UNSTEADY SOLUTION OF THE BOUNDARY LAYER EQUATIONS WITH APPLICATION TO SPACE SHUTTLE TILES M.S. Thesis

Karen J. Lange Jun. 1985 111 p refs
(AD-A164105; AFIT/GAE/ENY/84D-11) Avail: NTIS HC A06/MF A01 CSCL 20/13

Wind tunnel tests were conducted on space shuttle orbiter insulating articles. The data, processed by a heat estimation computer program, revealed a large discrepancy in magnitude of the heat transfer coefficient over the space shuttle tile when compared to that yielded by flat plate theory and thin skin test results. A suggested cause of this discrepancy was the nonisothermal wall effect. The boundary layer equations were transformed, using the Dorodnitsyn transformation to allow the equations to be solved similar to incompressible equations. These equations were then transformed to the computational plane and approximated by finite differences. Optimized successive overrelaxation was used to solve the difference equations. The grid used for this program is optimized based on the Blasius solution. Upon running this program, leading edge startup problems arose so a similarity solution is assumed at the leading edge which corrects the problem. The program was verified with an incompressible case which was in good agreement with the Blasius solution, and a compressible case with an isothermal wall which agreed well with approximate theory. The isothermal case showed the solution was dependent on the grid. The steady state and transient nonisothermal wall cases displayed the same trend as the approximate nonisothermal solution. All cases had the same dramatic decrease in the heat transfer coefficient and the subsequent recovery. GRA

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

N86-24728# Ballistic Research Labs., Aberdeen Proving Ground, Md.

MEASUREMENT OF INTERIOR BALLISTIC PERFORMANCE USING FM/FM RADIO TELEMETRY TECHNIQUES

James W. Evans Dec. 1985 97 p refs
(AD-A164150; BRL-TR-2699) Avail: NTIS HC A05/MF A01 CSCL 09/6

The continuous measurement of ballistic performance during the interior ballistic cycle of cannon launched projectiles is important to on-going research programs being conducted at the Ballistic Research Laboratory (BRL). These measurements, such as propelling gas pressure, projectile acceleration, and projectile-bore interactions, are necessary to evaluate existing weapon systems and validate newly formulated interior ballistic models. Of particular interest is the resistance to projectile motion and the behavior of the projectile during the engraving process. The measurement of forces on projectiles and projectile-bore interactions requires that transducers be located on-board the projectile. In-bore measurements of ballistic performance are made at the BRL using an FM/FM, S-band telemeter. Standard artillery projectiles are modified and instrumented with telemetry transmitting systems. These projectiles are test fired and data extracted via the real time telemetry link. The projectile systems are expendable free-flight rounds and those modified for recovery in the BRL Large Caliber Soft Recovery System (LCSRS). The instrumentation package for the recoverable rounds is configured so it can be removed from the projectile, recalibrated after exposure to the launch environment, and used on subsequent rounds. GRA

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N86-24729* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SHUTTLE-LAUNCH TRIANGULAR SPACE STATION Patent
William C. Schneider, inventor (to NASA), REginald B. Berka, inventor (to NASA), C. Kavanaugh, inventor (to NASA), Kornel Nagy, inventor (to NASA), Richard C. Parish, inventor (to NASA), John A. Schliesing, inventor (to NASA), Paul D. Smith, inventor (to NASA), Frederick J. Stebbins, inventor (to NASA), and Clarence J. Wesselski, inventor (to NASA) Issued 1 Apr. 1986 9 p Filed 9 Mar. 1984 Sponsored by NASA
(NASA-CASE-10676-1; US-Patent-4,579,302; US-Patent-Appl-SN-587764; US-Patent-Class-244-159) Avail: US Patent and Trademark Office CSCL 22B

A triangular space station deployable in orbit is described. The framework is comprized of three trusses, formed of a pair of generally planar faces consistine of foldable struts. The struts expand and lock into rigid structural engagement forming a repetition of equilater triangles and nonfolding diagonal struts interconnecting the two faces. The struts are joined together by node fittings. The framework can be packaged into a size and configuration transportable by a space shuttle. When deployed, the framework provides a large work/construction area and ample planar surface area for solar panels and thermal radiators. A plurity of modules are secured to the framework and then joined by tunnels to make an interconnected modular display. Thruster units for the space station orientation and altitude maintenance are provided.

Official Gazette of the U.S. Patent and Trademark Office

N86-24730*# Massachusetts Inst. of Tech., Cambridge. Space Systems Lab.
GENERALIZED PARITY RELATIONS FOR LARGE SPACE STRUCTURES WITH UNCERTAIN PARAMETERS M.S. Thesis
Jean R. Dutilloy Jan. 1986 72 p refs
(Grant NAG1-126)
(NASA-CR-176762; NAS 1.26:176762; Rept-2-86) Avail: NTIS HC A04/MF A01 CSCL 22B

The generalized parity relations method is a technique that can be used to detect sensor and actuator failures on a large space structure. A model of a grid structure was used to evaluate the performance of these relations. It shows their relative sensitivity to modeling errors. A method using sensor outputs and actuator inputs is required for the design of the generalized parity relations. Three different estimators are studied. The last estimator can generate relations optimized for the detection of a particular failure which are interesting when the level of sensor noise is high.

E.A.K.

N86-24731*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STRUCTURAL PERFORMANCE OF SPACE STATION TRUSSES WITH MISSING MEMBERS
John T. Dorsey May 1986 35 p refs
(NASA-TM-87715; NAS 1.15:87715) Avail: NTIS HC A03/MF A01 CSCL 22B

Structural performance of orthogonal tetrahedral and Warren-type full truss beams and platforms are compared. In addition, degradation of truss structural performance is determined for beams, platforms and a space station when individual struts are removed from the trusses. The truss beam, space station, and truss platform analytical models used in the studies are described. Stiffness degradation of the trusses due to single strut failures is determined using flexible body vibration modes. Ease of strut replacement is assessed by removing a strut and examining the truss deflection at the resulting gap due to applied forces. Finally, the reduction in truss beam strength due to a missing longeron is determined for a space station transverse boom model. Author

N86-24732*# Rockwell International Corp., Huntsville, Ala.
SPACE PLATFORM EXPENDABLES RESUPPLY CONCEPT DEFINITION STUDY Final Report, Jan. - Oct. 1985
Dec. 1985 116 p
(Contract NAS8-35618)
(NASA-CR-178819; NAS 1.26:178819; STS85-0174-Add) Avail: NTIS HC A06/MF A01 CSCL 22B

NASA has recognized that the capability for remote resupply of space platform expendable fluids will help transition space utilization into a new era of operational efficiency and cost/effectiveness. The emerging Orbital Maneuvering System (OMV) in conjunction with an expendables resupply module will introduce the capability for fluid resupply enabling satellite lifetime extension at locations beyond the range of the Orbiter. This report summarizes a supplemental study to the original Phase A study and is presented as addenda to that study. Author

N86-24733*# Rockwell International Corp., Downey, Calif.
SPACE PLATFORM EXPENDABLES RESUPPLY CONCEPT DEFINITION STUDY. VOLUME 1: EXECUTIVE SUMMARY Report, Mar. - Dec. 1984
Dec. 1984 36 p 4 Vol.
(Contract NAS8-35618)
(NASA-CR-178820; NAS 1.26:178820; STS-85-0174-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 22B

NASA has recognized that the capability for remote resupply of space platform expendable fluids will help transition space utilization into a new era of operational efficiency and cost/effectiveness. The emerging Orbital Maneuvering System (OMV) in conjunction with an expendables resupply module will introduce the capability for fluid resupply enabling satellite lifetime extension at locations beyond the range of the Orbiter. This report summarizes a Phase A study of a remote resupply module for the OMV. Volume 1 is the executive summary. Author

N86-24734*# Rockwell International Corp., Downey, Calif.
SPACE PLATFORM EXPENDABLES RESUPPLY CONCEPT DEFINITION STUDY, VOLUME 2 Technical Report, Mar. - Dec. 1984
Dec. 1984 295 p 4 Vol.
(Contract NAS8-35618)
(NASA-CR-178821; NAS 1.26:178821; STS-85-0174-Vol-2) Avail: NTIS HC A13/MF A01 CSCL 22B

NASA has recognized that the capability for remote resupply of space platform expendable fluids will help transition space utilization into a new era of operational efficiency and cost/effectiveness. The emerging Orbital Maneuvering System (OMV) in conjunction with an expendables resupply module will introduce the capability for fluid resupply enabling satellite lifetime extension at locations beyond the range of the Orbiter. This report summarizes a Phase A study of a remote resupply module for the OMV. Volume 2 represents study results. Author

N86-24735*# Rockwell International Corp., Downey, Calif.
SPACE PLATFORM EXPENDABLES RESUPPLY CONCEPT DEFINITION STUDY. VOLUME 3: WORK BREAKDOWN STRUCTURE AND WORK BREAKDOWN STRUCTURE DICTIONARY Technical Report, Mar. 1984 - Dec. 1984
Dec. 1984 13 p 4 Vol.
(Contract NAS8-35618)
(NASA-CR-178822; NAS 1.26:178822; STS-85-0174-Vol-3) Avail: NTIS HC A02/MF A01 CSCL 22B

The work breakdown structure (WBS) for the Space Platform Expendables Resupply Concept Definition Study is described. The WBS consists of a list of WBS elements, a dictionary of element definitions, and an element logic diagram. The list and logic diagram identify the interrelationships of the elements. The dictionary defines

the types of work that may be represented by or be classified under each specific element. The Space Platform Expendable Resupply WBS was selected mainly to support the program planning, scheduling, and costing performed in the programmatics task (task 3). The WBS is neither a statement-of-work nor a work authorization document. Rather, it is a framework around which to define requirements, plan effort, assign responsibilities, allocate and control resources, and report progress, expenditures, technical performance, and schedule performance. The WBS element definitions are independent of make-or-buy decisions, organizational structure, and activity locations unless exceptions are specifically stated. Author

N86-24736*# National Aeronautics and Space Administration, Washington, D.C.
SPACECRAFT ARCHITECTURE
V. V. Zefeld Mar. 1986 9 p refs Transl. into ENGLISH from Arkhitektura Kosmicheskikh Obyektov (Moscow, USSR), Nauka, 1977 p 187-191 Original language doc. was announced in IAA as A78-13592 Transl. by SCITRAN, Inc., Santa Barbara, Calif.
(Contract NASw-4004)
(NASA-TM-77908; NAS 1.15:77908) Avail: NTIS HC A02/MF A01 CSCL 22B

Three requirements for a spacecraft interior are considered. Adequate motor activity in the anatomical-physiological sense results from attention to the anthropometric characteristics of humans. Analysis of work requirements is a prerequisite for the planning of adequate performance space. The requirements for cognitive activity are also elucidated. The importance of a well-designed interior during a long space flight is discussed. Author

N86-24737*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A COMPUTER MODELING METHODOLOGY AND TOOL FOR ASSESSING DESIGN CONCEPTS FOR THE SPACE STATION DATA MANAGEMENT SYSTEM
William R. Jones Apr. 1986 45 p refs
(NASA-TM-87647; NAS 1.15:87647) Avail: NTIS HC A03/MF A01 CSCL 22B

A computer modeling tool is being developed to assess candidate designs for the Space Station Data Management System (DMS). The DMS is to be a complex distributed computer system including the processor, storage devices, local area networks, and software that will support all processing functions onboard the Space Station. The modeling tool will allow a candidate design for the DMS, or for other subsystems that use the DMS, to be evaluated in terms of parameters. The tool and its associated modeling methodology are intended for use by DMS and subsystem designers to perform tradeoff analyses between design concepts using varied architectures and technologies. Author

N86-24738# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
CONTROL OF A LARGE SPACE STRUCTURE USING DIRECT OUTPUT FEEDBACK AND MODAL SUPPRESSION M.S. Thesis
Eric E. Keller Dec. 1985 106 p refs
(AD-A163960; AFIT/GAE/AA/85D-10) Avail: NTIS HC A06/MF A01 CSCL 22/2

Direct output feedback control using one or two controllers is applied to the NASA Ground Test Facility offset antenna model. This is a test structure designed to have the vibration characteristics associated with large space structures. The control problem is transformed from physical variables into modal variables and reformulated into a first order system. This system is truncated to a reduced order model with residual modes used only in performance evaluation. Optimal linear quadratic regulator techniques are used to design the gain matrices and full state feedback is approximated by use of generalized inverses of the observation matrices. Spillover is eliminated through the use of transformation matrices. The structure is shown to be controllable with this method. Alternative sensor placement is explored and found to cause improvement in performance. The torsion modes are found to be particularly important to the performance of the structure but need more sensing and actuation to be adequately controlled. Two controller systems require more sensors and actuators than available to achieve acceptable performance with this structure. GRA

N86-24739# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE EFFECT OF ENERGY DISSIPATION DUE TO FRICTION AT THE JOINT OF A SIMPLE BEAM STRUCTURE M.S. Thesis
Robert P. Donnelly, Jr. Dec. 1985 81 p refs
(AD-A163975; AFIT/GAE/AA/85D-5) Avail: NTIS HC A05/MF A01 CSCL 22/2

The Strategic Defense Initiative has generated new interest in the development of more stable space structures. This interest has increased the need for more detailed knowledge of the behavior of engineering structures under dynamic loading. Interests lie in decreasing the amount of vibration by both passively and actively damping the structure. A means exists to passively damp structures by friction damping resulting from relative slip between joint interfaces. It may be feasible to increase the damping in a structure by allowing more friction damping than is normal and thereby controlling the vibration response. This thesis incorporates friction damping in a one-dimensional model. Finite element techniques are used to accomplish the numerical analysis. A clamped-clamped beam is used as the physical model. The mid-point of the two element beam is allowed to slip in rotation, but not in translation. Because the one-dimensional program cannot handle rotations at continuous nodes, the beam is modeled by symmetry about the joint and a cantilever beam with an applied end moment is studied. Results for the response of a beam in vibration are presented showing displacement of the joint, relative rotation at the joint, and relative angular velocity at the joint; all versus time. Various clamping pressures and initial loads are explored. Diagrams of the beam shape versus time show the shape the beam takes on when slip occurs at the joint. GRA

N86-24740# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
MOVING-BANK MULTIPLE MODEL ADAPTIVE ALGORITHMS APPLIED TO FLEXIBLE SPACECRAFT CONTROL M.S. Thesis
Paul G. Filios Dec. 1985 182 p refs
(AD-A164016; AFIT/GE/ENG/85D-14) Avail: NTIS HC A09/MF A01 CSCL 22/2

Critical to the performance of the moving-bank multiple model adaptive estimator is the decision logic used to determine which elemental filters are implemented in the bank, and when to change this decision. The decision logics discussed focus on three situations: initial acquisition of the unknown parameter values through reducing bank discretization; tracking the unknown parameter values through bank movement; and reacquisition of the unknown parameters following a large jump change in their values through expanding bank discretization. Ambiguity function analysis is used to predict performance in these situations. The system to be controlled is a simplified model of a large scale space structure. Its equations of motion are developed and placed in state space form, the states being the positions and velocities of the rigid body mode and the second and fourth bending modes. The state space matrices describing the system are computed based on nominal values for all physical parameters with the exception of the mass density of the structure arms and their modulus of elasticity. GRA

N86-24741# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A PROPOSED DESIGN FOR AN INTERIM SPACE RESCUE FERRY VEHICLE M.S. Thesis
James D. Halsell, Jr. Dec. 1985 211 p refs
(AD-A164039; AFIT/GSO/ENY/85D-2) Avail: NTIS HC A10/MF A01 CSCL 22/2

This investigation proposed a method of connecting the

Personnel Rescue Enclosure to the Manned Maneuvering Unit using a modified flight-qualified hardware item the Apogee Kick Motor Capture Device. The resulting configuration is an immediately available but non-optimum vehicle for transferring stranded astronauts housed within Personnel Rescue Enclosures from a rotating stranded spacecraft to a nearby rescue spacecraft. The flying qualities of this Interim Rescue Vehicle (IRV) were simulated using an existing NASA spaceflight simulation computer program. The results showed that the Manned Maneuvering Unit's control system was capable of limiting uncommanded IRV rotations to within the control law deadbands during all simulated maneuvers and in all control modes except during transverse translations in the backup control mode. The IRV's increased mass and increased center-of-mass/center-of-thrust offset signifi cantly degraded acceleration capability and specific propellant consumption. Plume impingement however was found to be of minor importance. The satellite stabilization mode was found to have significant rotational-to-translational coupling which made it undesirable for IRV use. Finally procedures were outlined for using the IRV in an orbiter-to-orbiter rescue scenario. Author (GRA)

N86-24742# Integrated Systems, Inc., Palo Alto, Calif.
ADAPTIVE CONTROL TECHNIQUES FOR LARGE SPACE STRUCTURES Annual Technical Report, 1 Jun. 1984 - 31 May 1985
Robert L. Kosut and Michael G. Lyons 18 Oct. 1985 121 p refs
(Contract F49620-84-C-0054)
(AD-A164240; ISI-63; AFOSR-85-1241TR) Avail: NTIS HC A06/MF A01 CSCL 22/2

The Large Space Structure (LSS) research program was originally formulated in late 1982 in response to the increasing concern that performance robustness of Air Force LSS type systems would be inadequate to meet mission objectives. In particular, uncertainties in both system dynamics and disturbance spectra characterizations (both time varying and stochastic uncertainty) significantly limit the performance attainable with fixed gain, fixed architecture controls. Therefore, the use of an adaptive system, where disturbances and/or plant models are identified prior to or during control, gives systems designers more options for minimizing the risk in achieving performance objectives. The aim of adaptive control is to implement in real time and on-line as many as possible of the design functions now performed off-line by the control engineer; to give the controller intelligence. To realize this aim, both a theory of stability and performance of such inherently nonlinear controls is essential as well as a technology capable of achieving the implementation. As has been noted, recent advances in each of these fronts have brought us to the position where adaptive control has been applied to many processes and standard adaptive controllers can be purchased. GRA

N86-24743# General Accounting Office, Washington, D. C. Resources Community and Economic Development Div.
WEATHER SATELLITE COSTS HAVE INCREASED, PROBLEMS HAVE OCCURRED IN THEIR MANUFACTURING QUALITY CONTROL
31 Oct. 1985 29 p
(PB86-131398; GAO/RCED-86-28; B-216229) Avail: NTIS HC A03/MF A01 CSCL 22B

The National Oceanic and Atmospheric Administration (NOAA) operates the nation's civilian weather satellite system. The cost of buying these satellites has risen steeply over the years and some of them have failed in orbit earlier than expected. The report discusses the reasons for increased satellite costs and failures and the actions taken. The report also discusses two problems with the manufacturing quality control of the weather satellites: contractors installation in the satellites of parts not approved by NASA and a shortage of government quality control inspectors at some contractor plants during fiscal year 1984. GRA

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

N86-24744*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
HALOGEN OCCULTATION EXPERIMENT INTERGRATED TEST PLAN
L. E. Mauldin, III and A. J. Butterfield (Bionetics Corp., Hampton, Va.) May 1986 225 p
(NASA-TM-87709; NAS 1.15:87709) Avail: NTIS HC A10/MF A01 CSCL 22B

The test program plan is presented for the Halogen Occultation Experiment (HALOE) instrument, which is being developed in-house at the Langley Research Center for the Upper Atmosphere Research Satellite (UARS). This comprehensive test program was developed to demonstrate that the HALOE instrument meets its performance requirements and maintains integrity through UARS flight environments. Each component, subsystem, and system level test is described in sufficient detail to allow development of the necessary test setups and test procedures. Additionally, the management system for implementing this test program is given. The HALOE instrument is a gas correlation radiometer that measures vertical distribution of eight upper atmospheric constituents: O3, HC1, HF, NO, CH4, H2O, NO2, and CO2. Author

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N86-24745*# Allied Bendix Aerospace, Teterboro, N.J.
EVALUATION OF A DOUBLE GIMBAL IPACS DESIGN
P. R. Burke and P. A. Coronato May 1986 28 p refs
(Contract NAS1-17658)
(NASA-CR-178040; NAS 1.26:178040) Avail: NTIS HC A03/MF A01 CSCL 10C

The suitability of various integrated power/attitude control systems (IPACS) rotor materials was analyzed. Three materials were investigated: (1) 6A1-4V-Titanium (the current IPACS rotor material); (2) B120 VCA Titanium; and (3) Custom 455 stainless steel. The preliminary linear vibration analysis was updated to include the weights and stiffnesses of the gimbals design. A belleville washer spring preload mechanism was designed to replace the existing helical spring and interference fit preload mechanism. E.A.K.

N86-24746*# Martin Marietta Aerospace, Denver, Colo.
ADVANCED ORBIT TRANSFER VEHICLE PROPULSION SYSTEM STUDY Final Report
J. A. Cathcart, T. W. Cooper, R. M. Corringrato, S. T. Cronau, S. C. Forgie, M. J. Harder, J. G. McAllister, T. J. Rudman, V. W. Stoneback et al Feb. 1985 174 p refs
(Contract NAS3-23858)
(NASA-CR-174843; NAS 1.26:174843) Avail: NTIS HC A08/MF A01 CSCL 21H

A reuseable orbit transfer vehicle concept was defined and subsequent recommendations for the design criteria of an advanced LO2/LH2 engine were presented. The major characteristics of the vehicle preliminary design include a low lift to drag aerocapture capability, main propulsion system failure criteria of fail operational/fail safe, and either two main engines with an attitude control system for backup or three main engines to meet the failure criteria. A maintenance and servicing approach was also established for the advanced vehicle and engine concepts.

Design tradeoff study conclusions were based on the consideration of reliability, performance, life cycle costs, and mission flexibility. B.G.

N86-24747*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

SPACE STATION 20-kHz POWER MANAGEMENT AND DISTRIBUTION SYSTEM

Irving G. Hansen and Gale R. Sundberg 1986 11 p refs Presented at the Power Electronics Specialists Conference, Vancouver, Bristish Columbia, 23-27 Jun. 1986; sponsored by Inst. of Electrical and Electronics Engineers

(NASA-TM-87314; E-3045; NAS 1.15:87314) Avail: NTIS HC A02/MF A01 CSCL 22B

During the conceptual design phase a 20-kHz power distribution system was selected as the reference for the space station. The system is single-phase 400 VRMS, with a sinusoidal wave form. The initial user power level will be 75 kW with growth to 300 kW. The high-frequency system selection was based upon considerations of efficiency, weight, safety, ease of control, interface with computers, and ease of paralleling for growth. Each of these aspects will be discussed as well as the associated trade-offs involved. An advanced development program has been instituted to accelerate the maturation of the high-frequency system. Some technical aspects of the advanced development will be discussed. Author

N86-24748*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

PERFORMANCE AND ENDURANCE TESTS OF A MULTIPROPELLANT RESISTOJET FOR SPACE STATION AUXILIARY PROPULSION

W. Earl Morren, Margaret V. Whalen, and James S. Sovey 1986 19 p refs Presented at the 22nd Joint Propulsion Conference, Huntsville, Ala., 16-18 Jun. 1986; sponsored by AIAA, ASME, SAE, and ASEE

(NASA-TM-87278; E-2981; NAS 1.15:87278) Avail: NTIS HC A02/MF A01 CSCL 21H

This paper presents the results of an effort to demonstrate the technology readiness of a long-life multipropellant resistojet for space station auxiliary propulsion. Experiments were performed to evaluate the compatibility of grain-stabilized platinum tubes at temperatures up to 1400 deg C in environments of CO2, CH4, NH3, H2O, and H2. All samples tested showed extrapolated lifetimes in excess of 10,000 hr based on 10 percent mass loss as end-of-life. However, samples tested in an ammonia atmosphere at 1400 deg C showed severe pitting, which raised concerns about the compatibility of grain-stabilized platinum with ammonia-containing atmospheres. Additional tests showed that reducing the metal temperature to about 900 deg C (+ or - 100 deg C) significantly reduced this adverse effect. Author

N86-24749*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

NASA ELECTROTHERMAL AUXILIARY PROPULSION TECHNOLOGY

James R. Stone 1986 26 p refs Presented at the 22nd Joint Propulsion Conference, Huntsville, Ala., 16-18 Jun. 1986; sponsored by AIAA, ASME, SAE and ASEE

(NASA-TM-87281; E-2986; NAS 1.15:87281; AIAA-86-1703) Avail: NTIS HC A02/MF A01 CSCL 21H

Electrothermal auxiliary propulsion systems provide high performance options which can have major mission benefits. There are several electrothermal concepts which offer a range of characteristics and benefits. Resistojets are the highest thrust to power option and are currently operational at mission average values of specific impulse, I sub sp approximately 295 sec. Long life, multipropellant resistojets are being developed for the space station, and resistojet technology advancements are being pursued to improve the I sub sp by more than 20 percent for resistojets used in satellite applications. Direct current arcjets have the potential of I sub sp over 400 sec with storable propellants and should provide over 1000 sec with hydrogen. Advanced concepts are being investigated to provide high power density options and possible growth to primary propulsion applications. Broad based experimental and analytical research and technology programs of NASA are summarized and recent significant advances are reviewed. Author

N86-24750*# Wyle Labs., Inc., Huntsville, Ala.

A DATA BASE AND ANALYSIS PROGRAM FOR SHUTTLE MAIN ENGINE DYNAMIC PRESSURE MEASUREMENTS Final Report

Thomas Coffin Jan. 1986 192 p

(Contract NAS8-34343)

(NASA-CR-178808; NAS 1.26:178808; Rept-66338-01) Avail: NTIS HC A09/MF A01 CSCL 21H

A dynamic pressure data base management system is described for measurements obtained from space shuttle main engine (SSME) hot firing tests. The data were provided in terms of engine power level and rms pressure time histories, and power spectra of the dynamic pressure measurements at selected times during each test. Test measurements and engine locations are defined along with a discussion of data acquisition and reduction procedures. A description of the data base management analysis system is provided and subroutines developed for obtaining selected measurement means, variances, ranges and other statistics of interest are discussed. A summary of pressure spectra obtained at SSME rated power level is provided for reference. Application of the singular value decomposition technique to spectrum interpolation is discussed and isoplots of interpolated spectra are presented to indicate measurement trends with engine power level. Program listings of the data base management and spectrum interpolation software are given. Appendices are included to document all data base measurements. Author

N86-24751*# Michigan State Univ., East Lansing. Coll. of Engineering.

GENERATION OF FREE RADICALS AND IONS FOR SPACECRAFT PROPULSION Final Report, 15 Aug. 1979 - 10 Mar. 1984

J. Asmussen, Martin Hawley, and Ronald Kerber 1985 6 p refs (Contract NASw-3299)

(NASA-CR-176672; NAS 1.26:176672) Avail: NTIS HC 2/MF A01 CSCL 21H

The long-term objective at this research grant was to examine the feasibility of several electric propulsion concepts that employ microwave electricity as the source of energy. These electric propulsion concepts were (1) a microwave free radical engine, (2) a microwave ion engine and (3) a microwave electrothermal engine. The research not only involved the conceptualization of practical microwave engine concepts but also included special experimental studies which produced and measured concentrations of ions, excited species and free radicals in a microwave discharge under a wide range of experimental conditions. These conditions included continuous wave input microwave power levels of a few watts to over 1000 W, discharge pressures from less than one micron to over one atmosphere and under flowing and nonflowing gaseous environments. Major accomplishments of the research are discussed. Author

N86-24752# Rockwell International Corp., Canoga Park, Calif. Rocketdyne Div.

RADIATION AUGMENTED PROPULSION FEASIBILITY Final Report, 17 Sep. 1984 - 28 Sep. 1985

S. C. Hurlock, V. Quan, J. Blauer, J. R. Hall, and R. I. Wagner Dec. 1985 113 p refs

(Contract F04611-84-C-0047)

(AD-A163983; RI/RD85-257; AFRPL-TR-85-068) Avail: NTIS HC A06/MF A01 CSCL 10/1

Gas phase absorption of solar radiation has been suggested as an energy source to power space propulsion systems. The absorbing gas could be an expendable propellant or could be used in a closed cycle, exchanging heat with an expendable propellant. This study was conducted in order to develop basic data and understanding useful for the evaluation of such a system with the absorbing gas being a halogen or an interhalogen.

Experiments and analysis were conducted to characterize the absorption of ultraviolet and visible radiation and subsequent energy release in chlorine gas, iodine monochloride vapor, and mixtures of hydrogen gas and chlorine gas. Xenon flashlamps were used to provide the radiation. Measurements included lamp electrical and optical characteristics, light energy absorbed, pressure rise in the closed reactor and reactants remaining after the reaction. Analysis included detailed kinetic modeling of the single shot experiments. GRA

N86-24753# Tennessee Univ. Space Inst., Tullahoma.
LASER THERMAL PROPULSION Annual Report, 15 Jan. 1984 - 14 Apr. 1985
Dennis Keefer 29 Aug. 1985 6 p refs
(Grant AF-AFOSR-0043-83)
(AD-A164163; AFOSR-86-0029TR) Avail: NTIS HC A02/MF A01 CSCL 21/3

The principal objective of this research investigation is to determine experimentally the effects of a forced convection environment and optical geometry on the stability, fractional power absorption, plasma structure, and fluid mixing in a laser sustained plasma (LSP). A continuous, 1.5 kw, axial flow, carbon dioxide laser was used to create the LSP in a cylindrical quartz flow channel. The convection flowfield surrounding the plasma was controlled by the volume flow through the test chamber, and the optical geometry was determined by the focal length of the lens. Data were obtained for argon plasmas at pressures from 1 to 2.3 atmospheres, mean incident flow velocities to cm/s and nominal incident laser power of 1 kw. Spatially resolved measurements of the plasma temperature were obtained from spectral images of the LSP and, using these measured temperatures, it was possible to determine the spatially resolved laser power absorption and thermal emission within the plasma. Substantial differences in plasma shape, absorbed power, and pressure dependence were found for lenses of different focal length. GRA

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

No abstracts in this category.

24 COMPOSITE MATERIALS

Includes laminates.

N86-24754 British Library Lending Div., Boston Spa (England).
DAMPING PROPERTIES OF GRANULE-BASED COMPOSITE MATERIALS
V. N. Brinza and E. V. Kolyadina 1985 4 p refs Transl. into ENGLISH from Izvestiya (USSR), no. 9, 1985 p 172-173
(BLL-M-36692-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The damping capacity of composite materials, compacted from mixtures of granules of dissimilar aluminum alloys, is demonstrated to be a function of the weight and size ratios of the hardening to plasticizing granules in the mixture. The investigated composite granular materials are now being used to make certain parts of automatic cold heading machines. Author

N86-24755*# Wyoming Univ., Laramie.
ANALYSIS OF THE STRESS STATE IN AN IOSIPESCU SHEAR TEST SPECIMEN Technical Report, May 1982 - May 1983
David E. Walrath and Donald F. Adams Jun. 1983 86 p refs
(Grant NAG1-272)
(NASA-CR-176745; NAS 1.26:176745; UWME-DR-301-102-1) Avail: NTIS HC A05/MF A01 CSCL 11D

The state of stress in a Iosipescu shear test specimen is analyzed, utilizing a finite element computer program. The influence of test fixture configuration on this stress state is included. Variations of the standard specimen configuration, including notch depth, notch angle, and notch root radius are modeled. The purpose is to establish guidelines for a specimen geometry which will accommodate highly orthotropic materials while minimizing stress distribution nonuniformities. Materials ranging from isotropic to highly orthotropic are considered. An optimum specimen configuration is suggested, along with changes in the test fixture Author

N86-24756*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THERMOVISCOPLASTIC NONLINEAR CONSTITUTIVE RELATIONSHIPS FOR STRUCTURAL ANALYSIS OF HIGH TEMPERATURE METAL MATRIX COMPOSITES
Christos C. Chamis and Dale A. Hopkins 1985 25 p ref Presented at First Symposium on Testing Technologyof Metal Matrix Composites, Nashville, Tenn., 18-20, 1985; sponsored by American Society for Testing Materials
(NASA-TM-87291; E-2998; NAS 1.15:87291) Avail: NTIS HC A02/MF A01 CSCL 11D

A set of thermoviscoplastic nonlinear constitutive relationships (1VP-NCR) is presented. The set was developed for application to high temperature metal matrix composites (HT-MMC) and is applicable to thermal and mechanical properties. Formulation of the TVP-NCR is based at the micromechanics level. The TVP-NCR are of simple form and readily integrated into nonlinear composite structural analysis. It is shown that the set of TVP-NCR is computationally effective. The set directly predicts complex materials behavior at all levels of the composite simulation, from the constituent materials, through the several levels of composite mechanics, and up to the global response of complex HT-MMC structural components. E.A.K.

N86-24757*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A UNIQUE SET OF MICROMECHANICS EQUATIONS FOR HIGH TEMPERATURE METAL MATRIX COMPOSITES
Dale A. Hopkins and Christos C. Chamis 1985 27 p refs Presented at the 1st Symposium on Testing Technology of Metal Matrix Composites, Nashville, Tenn., 18-20 Nov. 1985; sponsored by American Society for Testing and Materials
(NASA-TM-87154; E-2780; NAS 1.15:87154) Avail: NTIS HC A03/MF A01 CSCL 11D

A unique set of micromechanic equations is presented for high temperature metal matrix composites. The set includes expressions to predict mechanical properties, thermal properties and constituent microstresses for the unidirectional fiber reinforced ply. The equations are derived based on a mechanics of materials formulation assuming a square array unit cell model of a single fiber, surrounding matrix and an interphase to account for the chemical reaction which commonly occurs between fiber and matrix. A three-dimensional finite element analysis was used to perform a preliminary validation of the equations. Excellent agreement between properties predicted using the micromechanics equations and properties simulated by the finite element analyses are demonstrated. Implementation of the micromechanics equations as part of an integrated computational capability for nonlinear structural analysis of high temperature multilayered fiber composites is illustrated. E.A.K.

N86-24758*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
EFFECTS OF SEAWATER AND DEIONIZED WATER AT 0 TO 80 DEG C ON THE FLEXURAL PROPERTIES OF A GLASS/EPOXY COMPOSITE
B. G. Penn, J. G. Daniels, F. E. Ledbetter, III, M. L. Semmel, B. G. Goldberg, W. T. White, and J. M. Clemons Mar. 1986 11 p refs
(NASA-TM-86544; NAS 1.15:86544) Avail: NTIS HC A02/MF A01 CSCL 11D

The effect on the flexural properties of a glass/epoxy composite of immersion in deionized water or seawater at 0, 25, and 80 C for 451 hr was examined. The percent weight gain at 0 and 25 C was low (0.06 to 0.17 percent) and there was no significant change in the flexural properties for these environmental conditions. At 80 C there was a decrease in the flexural strength of 17 and 20 percent in seawater and deionized water, respectively. This is a comparison to control samples exposed to 80 C heat alone. These decreases were found to be nearly reversible once the samples were dried. Optical microscopy did not reveal cracking of the matrix. The flexural modulus was essentially unaffected by exposure to deionized water and seawater at 80 C. Author

N86-24759*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SIMPLIFIED COMPOSITE MICROMECHANICS FOR PREDICTING MICROSTRESSES
Christos C. Chamis 1986 27 p refs Presented at 41st Annual Conference of the Society of the Plastics Industry (SPI) Reinforced Plastics/Composites Inst., Atlanta, Ga., 27-31 Jan. 1986
(NASA-TM-87295; E-2782; NAS 1.15:87295) Avail: NTIS HC A03/MF A01 CSCL 11D

A unified set of composite micromechanics equations is summarized and described. This unified set is for predicting the ply microstresses when the ply stresses are known. The set consists of equations of simple form for predicting three-dimensional stresses (six each) in the matrix, fiber, and interface. Several numerical examples are included to illustrate use and computational effectiveness of the equations in this unified set. Numerical results from these examples are discussed with respect to their significance on microcrack formation and, therefore, damage initiation in fiber composites. Author

N86-24760*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Business Group.
EVALUATION OF CAPILLARY REINFORCED COMPOSITES Contractor Report, Sep. 1984 - Sep. 1985
J. E. Cahill, J. F. Halase, W. K. South, and L. J. Stoffer Sep. 1985 141 p Original contains color illustrations
(Contract NAS3-24386)
(NASA-CR-175061; NAS 1.26:175061) Avail: NTIS HC A07/MF A01 CSCL 11D

Anti-icing of the inlet of jet engines is generally performed with high pressure heated air that is directed forward from the compressor through a series of pipes to various manifolds located near the structures to be anti-iced. From these manifolds, the air is directed to all flowpath surfaces that may be susceptible to ice formation. There the anti-icing function may be performed by either heat conduction or film heating. Unfortunately, the prospect of utilizing lightweight, high strength composites for inlet structures of jet engines has been frustrated by the low transverse thermal conductivity of such materials. It was the objective of this program to develop an advanced materials and design concept for anti-icing composite structures. The concept that was evaluated used capillary glass tubes embedded on the surface of a composite structure with heated air ducted through the tubes. An analytical computer program was developed to predict the anti-icing performance of such tubes and a test program was conducted to demonstrate actual performance of this system. Test data and analytical code results were in excellent agreement. Both indicate feasibility of using capillary tubes for surface heating as a means for composite engine structures to combat ice accumulation. Author

N86-24761*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
INVESTIGATION OF PARAMAGNETIC RESPONSE OF METALLIC EPOXIES Final Report, 1 Jun. - 31 Aug. 1985
Robert L. Ash and Hoshang Chegini Apr. 1986 13 p refs
(Contract NAS1-17993)
(NASA-CR-176551; NAS 1.26:176551) Avail: NTIS HC A02/MF A01 CSCL 11D

The paramagnetic properties of epoxies which were impregnated with metal ions were examined as the primary task in this research. A major conclusion was that the quality control of the epoxies was insufficient to permit reliable evaluation. Subsequently, a new set of specimens is being prepared. As an additional task, a new method is investigated for estimating heats of combustion for saturated hydrocarbons. The results of that investigation have shown that the empirical approach is a promising method for on-line measurements. Author

N86-24762# Martin Marietta Aerospace, Denver, Colo.
DAMPING CHARACTERISTICS OF METAL MATRIX COMPOSITES Quarterly Letter Report, 15 Sep. - 11 Dec. 1985
Mohan S. Misra 11 Dec. 1985 6 p refs
(Contract N00014-85-C-0857)
(AD-A163569; MCR-85-721) Avail: NTIS HC A02/MF A01 CSCL 11/4

Fiber reinforced metal matrix composites (MMC) are candidate structural materials for Large Space Structures because of their high specific stiffness, specific strength, and low coefficient of thermal expansion. In addition, MMC exhibits higher damping than structural alloys of aluminum or titanium, and the potential exists for designing MMC with predetermined damping, strength, and stiffness properties. In the present investigation P55/6061 Al composites with different fiber-fiber (consequently, fiber volume) spacing have been selected to study the damping characteristics. GRA

N86-24763# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE DETERMINATION OF THE NATURAL FREQUENCIES AND MODE SHAPES FOR ANISOTROPIC LAMINATED PLATES INCLUDING THE EFFECTS OF SHEAR DEFORMATION AND ROTATORY INERTIA M.S. Thesis
John A. Bowlus Sep. 1985 124 p refs
(AD-A164040; AFIT/GA/AA/85S-1) Avail: NTIS HC A06/MF A01 CSCL 11/4

An analytical study was conducted to determine the natural frequencies and mode shapes for laminated anisotropic plates, including the effects of shear deformation and rotatory inertia, by using the Galerkin Technique. Three different boundary conditions, simply-supported, clamped, and two opposite sides clamped, two opposite sides simply-supported, were considered. Two different graphite epoxy symmmetric plates were used in the analysis. Convergence characteristics and the effects of length to thickness ratios were investigated. Comparison to classical results and contour plots for several mode shapes are provided. It was found that as the length to thickness ratios were reduced, shear deformation effects significantly lowered the natural frequencies. Analysis also showed that rotatory inertia effects were very small. Convergence characteristics for all three boundary conditions were very good and excellent agreement with classical solutions was achieved. GRA

N86-24764# California Univ., San Diego, La Jolla. Dept. of Applied Mechanics and Engineering.
A MIXTURE MODEL FOR UNIDIRECTIONALLY FIBER-REINFORCED COMPOSITES Technical Report, Jul. 1984 - Dec. 1985
H. Murakami and G. A. Hegemier Dec. 1985 37 p refs
(Contract N00014-84-K-0468)
(AD-A164136) Avail: NTIS HC A03/MF A01 CSCL 11/4

A binary mixture theory with microstructure is constructed for unidirectionally fiber-reinforced elastic composites. Model construction is based on a asymptotic scheme with multiple scales and the application of Reissner's new mixed variational principle (1984). In order to assess the accuracy of the model, comparison of the mixture model predictions with available experimental data on dispersion of harmonic waves is made for boron/epoxy and tungsten/aluminum composites. Formulas for the effective moduli are also presented, and the results are compared with the test data and other available predictions. GRA

N86-24765# Texas A&M Univ., College Station. Mechanics and Materials Research Center.
DAMAGE MODELS FOR DELAMINATION AND TRANSVERSE FRACTURE IN FIBROUS COMPOSITES Annual Technical Report, 15 Feb. 1984 - 14 Feb. 19
R. A. Schapery, J. R. Weatherby, and R. D. Tonda May 1985 74 p refs
(Grant AF-AFOSR-0068-84)
(AD-A164164; MM-5034-85-8; AFOSR-85-1226TR) Avail: NTIS HC A04/MF A01 CSCL 11/5

Theoretical and experimental work on the deformation and fracture of fibrous composites with distributed damage is described. Emphasis is on establishing the existence of potentials analogous to strain energy and on using these so-called work potentials in fracture studies. The difference between loading and unloading behavior is accounted for by using one work potential for changing damage (loading) and another for constant damage (unloading). First, using work potentials in a finite element representation, a new method for predicting crack growth is described which is believed to be applicable to many different materials. The results confirm the previously predicted path independence of the J integral for a crack in a continuum with distributed damage; the damage is modelled in this initial study using deformation plasticity theory for loading and elasticity theory for unloading. Described next are investigations of flat rectangular bar specimens and thin-walled tubes under axial and torsional loading. The limited amount of experimental data presently available on angle-ply laminates confirms the existence of a potential even when there are large increases in microcracking. Author (GRA)

N86-24766# United Technologies Research Center, East Hartford, Conn.
DETECTION AND LOCATION OF BALLISTIC DAMAGE IN COMPOSITE MATERIALS USING ACOUSTIC EMISSION METHODS Final Report, Sep. 1984 - Oct. 1985
J. F. Jaminet, M. W. Hawman, and R. S. Williams Dec. 1985 75 p refs
(Contract DAAG29-84-C-0054; DA Proj. 1L1-62105-AH-84)
(AD-A164183; MTL-TR-85-37) Avail: NTIS HC A04/MF A01 CSCL 19/4

A method for increasing survivability is described whereby the acoustic emissions generated by ballistic impacts on composite helicopter structural components are recorded and analyzed using a preliminary digital transient data recording test system, the Digital Acoustic Emission System (DAES) and lightweight sensors utilizing polyvinylidene fluoride (PVDF) film. A total of 77 ballistic impacts on six composite test segments using a variety of fragment simulating projectiles (FSP) with different muzzle velocities and impact energies are descriibed. The results verify the capability of the measurement system to detect, locate, and analyze the severity of ballistic impacts. The ratio of the peak RMS value of the output signal from two sensors is shown to be a good indicator of impact energy absorption, or damage severity. Calculated hit locations are found with a mean error of 7% of the sensor array edge distance. GRA

N86-24767# Texas A&M Univ., College Station. Mechanics and Materials Research Center.
RESIDUAL-STRESS INDUCED DAMAGE IN COMPOSITE MATERIALS Annual Technical Report, 1 Feb. 1984 - 31 Jan. 198
Y. Weitsman Apr. 1985 19 p refs
(Grant AF-AFOSR-0069-84)
(AD-A164191; MM-5022-85-5; AFOSR-85-1224TR) Avail: NTIS HC A02/MF A01 CSCL 11/4

The main objective of this research is to evaluate the role of temperature and moisture as damage inducing agents in composites. This objective is to be achieved by subjecting composite coupons to several excursions of temperature and humidity, with variations in both amplitudes and rates, and inspecting the resulting damage. Furthermore, the formation and growth of damage are to be modelled analytically in order to relate them to material properties and ambient environmental conditions. GRA

N86-24768 Rensselaer Polytechnic Inst., Troy, N.Y.
THREE DIMENSIONAL FINITE ELEMENT ANALYSIS OF FAILURE IN COMPOSITE LAMINATES Ph.D. Thesis
Jieh-Ren Yeh 1985 133 p
Avail: Univ. Microfilms Order No. DA8528673

A compact finite element formulation based on singularity transformation is presented and used to analyze the mathematical nature of stress singularities at the boundary-layer in laminated composites. The stress singularities depend on material properties of adjacent laminae and local boundary conditions. Next, three dimensional elastic response of laminated composites to thermomechanical loading is formulated and analyzed using the finite element method. Individual laminae are modeled as homogeneous and transversely anisotropic. Particular attention is given to the interlaminar stresses near free edges. Three dimensional intralaminar and interlaminar failure criteria of unidirectional fiber composites are established. Six distinct failure modes including tensile fiber, tensile matrix, compressive matrix, tensile delamination and compressive delamination failure modes are modeled separately. The three dimensional finite element analysis in conjunction with the intralaminar and interlaminar failure criteria is developed to analyze the failure behavior of laminated composites with free edge. A compact finite element formulation based on singularity transformation is presented and ised laminated composites with free edge. Results obtained by the present analysis are compared with the experimental data, good agreement is achieved. Dissert. Abstr.

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N86-24769*# National Aeronautics and Space Administration, Washington, D.C.
CONDUCTIMETRIC DETERMINATION OF DECOMPOSITION OF SILICATE MELTS
C. Kroeger and K. Lieck Mar. 1986 20 p refs Transl. into ENGLISH from Zeitschrift fuer anorganische und allgemeine Chemie, v. 279, 1955, p 300-312 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-4005)
(NASA-TM-88394; NAS 1.15:88394) Avail: NTIS HC A02/MF A01 CSCL 07D

A description of a procedure is given to detect decomposition of silicate systems in the liquid state by conductivity measurements. Onset of decomposition can be determined from the temperature curves of resistances measured on two pairs of electrodes, one above the other. Degree of decomposition can be estimated from temperature and concentration dependency of conductivity of phase boundaries. This procedure was tested with systems PbO-B2O3 and PbO-B2O3-SiO2. Author

N86-24770# National Aeronautics and Space Administration, Washington, D.C.
THE THALLIUM MONOBORATE-BORIC ACID ANHYDRIDE BINARY SYSTEM
R. Bouaziz and M. Touboul Mar. 1986 8 p refs Transl. into ENGLISH of "Le System Binaire Monoborate de Thallium-Anhydride Borique" (Paris, France) v. 264, no. 16, Ser. C., 17 Apr. 1967 p 1374-1477 Transl. by the Corporate Word, Inc., Pittsburgh, Pa.
(Contract NASw-4006)
(NASA-TM-88393; NAS 1.15:88393) Avail: NTIS HC A02/MF A01 CSCL 07D

Direct thermal analysis of Ti2O-B2O2 mixtures containing 13 to 15 wt.% B2O2 in a Pt crucible with a Pt-(Pt-10% Rh) thermocouple is described. The mixtures were heat treated to obtain a well crystallized product. Five borates were characterized. Radiocry-

stallography could not be done for the alpha varieties. Powder diagrams were presented. BG

N86-24771# Puerto Rico Univ., Rio Piedras. Dept. of Physics.
ANALYTIC SOLUTION OF THE MOLECULAR ORNSTEIN-ZERNIKE EQUATION FOR NON-SPHERICAL MOLECULES SPHERES WITH ANISOTROPIC SURFACE ADHESION Interim Technical Report
Peter T. Cummings and Lesser Blum 15 Oct. 1985 40 p refs Prepared in cooperation with Virginia Univ., Charlottesville
(Contract N00014-81-C-0776)
(AD-A163451; AD-E401440; TR-19) Avail: NTIS HC A03/MF A01 CSCL 07/4

The molecular Ornstein-Zernike equation is solved for a fluid of hard spheres with anisotropic surface adhesion yielding a small set of non-linear algebraic equations which must be solved numerically in order to obtain structural and thermodynamic properties. It is argued that such a model mimics the short-ranged, anisotropic interactions encountered in hydrogen-bonded fluids such as water. GRA

N86-24772# Puerto Rico Univ., Rio Piedras. Dept. of Physics.
AN IMPROVED CLOSURE OF THE BORN-GREEN-YVON EQUATION FOR THE ELECTRIC DOUBLE LAYER Interim Technical Report
C. Caccamo, G. Pizzimenti, and L. Blum 15 Oct. 1985 41 p refs
(Contract N00014-81-C-0776)
(AD-A163452; AD-E401440; TR-20) Avail: NTIS HC A03/MF A01 CSCL 07/4

An extensive series of calculations are made to compare an improved closure of the Born-Green-Yvon (BGY) equation for the electric double layer of primitive electrolytes to existing Monte Carlo simulation and other theories, such as the modified Poisson Boltzmann (version: 5) (MPB5) and the Hypernetted chain/mean spherical approximation (HNC,MSA) and its recent improvements. In contrast to these theories the BGY equation satisfies the contact theorem always. Furthermore, the bulk pair correlations function used are the most accurate available, namely the HNC bulk results. The results show very good general agreement to the computer work for high densities and surface charges. In particular, higher densities are obtained than those hitherto published in the literature. For low density 2-2 and 2-1 electrolytes the agreement is not as good. GRA

N86-24773# Army Armament Research and Development Command, Dover, N. J.
CARS (COHERENT ANTI-STOKES RAMAN SCATTERING) SPECTROSCOPY OF THE REACTION ZONE OF METHANE-NITROUS OXIDE AND RDX PROPELLANT FLAMES Technical Report, Oct. 1984 - Sep. 1985
L. E. Harris Jan. 1986 54 p refs Presented at 10th International Colloquim on Dynamics of Explosives and Reactive Systems, Berkeley, Calif., Aug. 1985
(AD-A163465; AD-E401440; ARAED-TR-85007) Avail: NTIS HC A04/MF A01 CSCL 19/1

CARS spectra were obtained for a phi = 3.2 CH4/N20 model and nitramine propellant flames throughout the reaction and post-flame zones in order to assess kinetic mechanisms occurring in these flames. The reaction zone of the rich CH4/N20 flame was studied primarily to provide a stationary flame analog to the transient propellant flame. In the CH4/N20 flame, the decay of the initial products was observed through the Q-branch of the nu 1 and nu 3 modes of N20 and the Q, O and S branches of nu 2 and 2 nu 2 modes of CH4. The formation of the products N2, H2 Q(v' = 0 and v' = 1) and S(5) - S(9), and CO2 were also observed. Temperatures were obtained from both the H2 and N2 Q-branches. In the nitramine propellant flame, the upper bound of the gas-surface interface temperature was measured as 900 K + or 100 K from the H2 Q-branch. Near the surface of the propellant, reactant RDX (1599 cm-1 tentatively assigned as asymetric NO2 stretch) and transients HCN (NU1) and NO are observed as moderate concentration (> or = 1%). The final product N2 is observed at low concentration, (approx. 1%), H2 (Q and S beaches) and CO are observed at higher concentration (> or = 10%). RDX and HCN decay within 2 mm of the propellant surface while NO remains constant until 4 mm where it decays with a concommi tant rise in N2 concentration and temperature. H2 and CO also increase in temperature and concentration. GRA

N86-24774# Naval Surface Weapons Center, Silver Spring, Md.
A VOLUMETRIC METHOD FOR TITRIMETRIC ANALYSIS OF HYDROGEN PEROXIDE
Walter G. Cox 6 May 1985 18 p refs
(AD-A163582; NSWC/TR-85-210) Avail: NTIS HC A02/MF A01 CSCL 07/4

This report documents an oxidation-reduction scheme for the volumetric analysis of hydrogen peroxide in the approximate range of 30 percent, but it is not limited to this range. The purpose of the proposed method is to provide a titrimetric, noninstrumental method for the analysis of hydrogen peroxide. GRA

N86-24775# California Univ., San Diego, La Jolla. Dept. of Chemistry.
CATALYSIS OF HYDROLYSIS REACTIONS BY PLATINUM AND NICKEL PHOSPHINE COMPLEXES Final Report, 1 Oct. 1983 - 30 Sep. 1985
William C. Trogler 10 Oct. 1985 14 p refs
(Contract DAAG29-83-K-0175)
(AD-A163666; ARO-20979.6-CH) Avail: NTIS HC A02/MF A01 CSCL 07/3

Synthesis and mechanistic characterization of transition metal complexes that are catalysts for hydration and hydrolysis reactions is the major focus. Oxidative addition of water to a metal center generates a metal hydrido-hydroxy species. In this way the nucleophilicity of water increases greatly. Among the reactions studied are hydration of olefins, nitriles, alkynes, and dienes as well as hydrolysis of phosphate esters. Practical goals of the research are the discovery of catalysts for the synthesis of key industrial chemicals and for the neutralization of toxic chemical agents. Progress has been made in three areas; (1) photochemical and thermal sources of NiL2, PdL2, and PtL2 catalyst precursors; (2) catalytic hydrolysis of nitrile, olefinic, and phosphate ester groups as well as studies of the mechanism of catalysis; and (3) synthesis and characterization of silica supported platinum catalysts for hydrosilation and hydrolysis. GRA

N86-24776# California Univ., San Diego, La Jolla. Dept. of Applied Mechanics and Engineering Science
MECHANISMS OF COMBUSTION OF HYDROCARBON/ALCOHOL FUEL BLENDS Final Report, 15 Sep. 1982 - 30 Sep. 1985
Kalyanasundaram Seshadri and Anthony P. Hamins Dec. 1985 103 p refs
(Contract DAAG29-82-K-0079)
(AD-A163737; ARO-19434.9-EG) Avail: NTIS HC A06/MF A01 CSCL 21/2

Results reported here directly support the U.S. Army's research and development program in alternative fuels. Liquid fuels which are homogeneous solutions of hydrocarbon and alcohol fuels are considered here. Since combustion of diesel fuel resembles that in a diffusion flame, and because turbulent nonpremixed combustion can be considered as a statistical collection of strained, laminar flamelets, studies were performed on the structure and mechanisms of extinction of strained, laminar diffusion flames and strained laminar partially premixed diffusion flames. Use of alternate fuels often results in soot formation which causes easy detection of the vehicle. Therefore, studies were also performed to clarify the chemical mechanisms of soot formation in diffusion flames. For a well controlled laboratory experiment it is essential that the composition of the fuel be known. Petroleum based fuels are often a blend of aromatics and aliphatic fuels. Therefore experiments were performed on representative fuels namely homogeneous solutions of heptane, toluene and methanol. Results were analyzed by use of asymptotic theories. The experimental apparatus is

described in Chapter 2. Results of the research are discussed in Chapters III - IX. Each chapter has a brief abstract describing the results. GRA

N86-24777# SRI International Corp., Menlo Park, Calif. Chemical Kinetics Dept.
DETERMINATION OF INITIAL CHEMICAL STEPS IN THE GAS-PHASE DECOMPOSITION OF ENERGETIC MOLECULES Final Technical Report, Sep. 1982 - Aug. 1985
Donald F. McMillen and David M. Golden 9 Jan. 1986 60 p refs
(Contract DAAG29-82-K-0169)
(AD-A163751; ARO-19328.1-CH) Avail: NTIS HC A04/MF A01 CSCL 07/4

Laser-powered homogeneous pyrolysis (LPHP) has been successfully used to provide conditions where surface-sensitive substrates can be indirectly heated by an infrared laser and allowed to react while remote from potentially catalytic surfaces. The use of the comparative rate technique with LPHP provides an accurate indirect temperature measurement and has made practical the extraction of thermal, decomposition Arrhenius parameters. A laser-heated, GC/MS-monitored, stirred-flow reaction cell has been used with cyclohexene as the internal temperature standard to determine Arrhenius parameters for the homogeneous gas phase thermal decomposition of nitrotoluene (o-NT), and 2,4-dinitrotoleune (2,4-DNT). In all cases the principal rate-limiting step is the homolysis of the Ar-NO2 bond. The measured Arrhenius parameters for homolysis range from log A = 14.5 to 16.4, and from Ea = 67.0 to 70.0 kcal/mol. The bond dissociation energies derived from the results are 71.4, 73.2, 71.4, 70.2 and 70.6 kcal/mol, respectively, for the above series of compounds. GRA

N86-24778# Ballistic Research Labs., Aberdeen Proving Ground, Md.
CONVECTIVE HEATING OF ENERGETIC MATERIALS Final Technical Report
Richard A. Beyer and Mark A. DeWilde Dec. 1985 28 p refs
(AD-A163919; BRL-TR-2701) Avail: NTIS HC A03/MF A01 CSCL 21/2

The pyrolysis and ignition dynamics of propellants and their components have been explored using convective heating at a flow rate of about 1 m/s at atmospheric pressure. Two major techniques were used for the dynamics studies. The first was a video camera and recorder which were used to record flame luminescence. Also used to study ignition dynamics was a high-speed shadow photography system which characterized regions of heat release following immersion of single propellant grains in the hot flow. A key observation was an unusual two-stage flame observed with NOSOL 363; no previous report has shown similar behavior with this propellant. Gas released during pyrolysis was analyzed using grab samples and infrared absorption spectroscopy. Key observations with HMX were: (1) the increase in relative amount of NO2 with respect to other species with increasing temperature, and (2) the probable detection of substantial amounts of formic acid. This latter has not previously been observed in HMX pyrolysis studies. GRA

N86-24779# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
HIGH RESOLUTION COHERENT ANTI-STOKES RAMAN SPECTROSCOPY OF DEUTERIUM GAS M.S. Thesis
David A. Russell Dec. 1985 74 p refs
(AD-A163946; AFIT/GEO/ENP/85D-4) Avail: NTIS HC A04/MF A01 CSCL 07/4

Coherent anti-Stokes Raman spectroscopy (CARS) is a third order nonlinear optical mixing process primarily used to probe gases. Two laser beams interact with the medium being studied producing a weak, third beam with a higher frequency than either of the lasers. High resolution CW coherent anti-Stokes Raman spectroscopy (CARS) was performed in molecular deuterium gas. Single mode argon ion and ring dye lasers were used to make accurate measurements of the Raman linewidths of the Q(0) through Q(4) transitions. These lines were examined at room temperature at pressures ranging from 0.35 to 20 atmospheres. The pressure broadening coefficient and the self diffusion coefficient of each line were obtained in this study and compared with other work. Additionally, the transition frequency of each line was measured and the frequency shift coefficients were obtained. GRA

N86-24780# Department of the Air Force, Washington, D.C.
NON-PERTURBING BEAM DEFLECTION SYSTEM AND METHOD FOR HIGH REPETITION RATE TEMPERATURE MEASUREMENT OF COMBUSTION FLAMES Patent Application
Larry P. Goss, inventor (to Air Force) Filed 24 Oct. 1985 26 p refs
(AD-D012154; US-Patent-Appl-SN-790714) Avail: NTIS HC A03/MF A01 CSCL 21/2

A novel laser beam deflection system and method for temperature measurement of combustion flames of known composition is described which comprises a thin wire for placement at a predetermined location within the flame; a pulsed laser source for directing a pulsed beam onto the wire for heating the wire and immediately surrounding gases of the flame to produce an acoustic pulse in the flame; a pair of probe laser sources for directing parallel probe beams through the flame in predetermined spaced relationship to each other and to the wire, and a pair of detectors and associated electronics for detecting the respective deflections of the probe beams resulting from interactions with the pulse and measuring the time difference between respective deflections of the probe beams to determine the speed of the acoustic pulse through the flame and the temperature of the flame from the speed determination. GRA

N86-24781# Pratt and Whitney Aircraft, West Palm Beach, Fla. Government Products Div.
ALTITUDE IGNITION/LEAN DECEL STUDY Final Report, Aug. 1983 - Jan. 1985
Dean Andreadis Nov. 1985 88 p
(Contract F33615-83-C-2329)
(AD-A163052; P/W/GPD-FR-18710; AFWAL-TR-85-2054) Avail: NTIS HC A05/MF A01 CSCL 21/2

Analytical tasks consisting of new or improved models for predicting altitude ignition and lean deceleration blowout are developed. The approach taken was to describe the ignition and flame stabilization limits in terms of characteristic time models. Characterisitic times associated with chemical kinetics, fuel evaporation and hot flow residence are quantified for ignition and lean deceleration blowout limits. These expressions were interrelated according to the criteria for successful ignition and flame stabilization. Statistical analysis was used to compare the various expressions and select the appropriate terms that formulate models which best fit the data for altitude ignition and lean deceleration blowout. The models linearly correlate variations in combustor pressure, inlet temperature, fuel-air ratio, fuel temperature, air velocity, pressure drop, combustor front end geometry and injector size using existing data from USAF, Navy, NASA and P&W sponsored programs on operability performance of military and commercial gas turbine combustors. These models have been based entirely on full scale engine test. GRA

N86-24782# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A MODEL FOR OXYGEN ATOM RECOMBINATION ON A SILICON DIOXIDE SURFACE Ph.D. Thesis
William A. Seward Dec. 1985 117 p refs
(AD-A163990; AFIT/DS/AA/85-1) Avail: NTIS HC A06/MF A01 CSCL 07/4

A steady state model for oxygen atom recombination for temperatures from 300 K to 2000 K on a silicon dioxide surface was developed based on the Langmuir-Rideal heterogeneous recombination mechanism. The bonding of atomic oxygen to the surface and the thermal desorption of atomic oxygen from the surface were also included in the model. The hypothesis was made that the gas-phase oxygen atoms combine directly with the oxygen atoms that constitute the silicon dioxide surface, with other gas-phase oxygen atoms replacing the lost atoms that were

bonded on the silicon dioxide surface matrix. The model agrees with the experimental data that is available in the literature, and provides an insight into the processes that control the recombination as a function of temperature. A set of two-dimensional, steady-state, laminar boundary-layer calculations was made using explicit numerical methods to demonstrate the use of this model and to explore the rational limits which may be placed on the role of catalysis for oxygen recombination on a silicon dioxide surface like that of the Space Shuttle. The predicted catalycity of the silicon dioxide surface did reduce the overall heating below that which would be predicted by a fully catalytic surface. GRA

N86-24783# Ballistic Research Labs., Aberdeen Proving Ground, Md.
COMPETING UNIMOLECULAR REACTIONS OF FLAME RADICALS. PART 1: ISOMERIZATION AND DISSOCIATION OF THE METHOXY RADICAL Final Technical Report
George F. Adams Nov. 1985 30 p refs
(AD-A164154; BRL-TR-2692) Avail: NTIS HC A03/MF A01 CSCL 07/4

Flame chemistry models for even simple chemical oxidations include hundreds of chemical reactions. The methoxy radical, CH30, appears as a constituent in chemical models that describe the oxidation of fuels, especially combustion systems. Ab initio electronic structure calculations provide chemical energy differences necessary for statistical mechanical rate coefficient estimates. We report the results of many-body perturbation theory results for two unimolecular reactions of the methoxy radical. Rate coefficient estimates for the dissociation (H-atom scission), and isomerization (1,2-hydrogen shift) reactions infer that these reactions compete at high temperatures. The results of this study do not provide a definitive demonstration that the isomerization reaction of the methoxy radical competes with the dissociation reaction. One simplified dynamical model suggests that the reactions do compete at high temperature. However, Troe's model for two-channel thermal unimolecular reactions predicts that the isomerization reaction does not compete with the dissociation reaction. The latter result, however, depends strongly upon the details of the energy-transfer processes that control the low-pressure rates, and on the rather gross approximations we've used in applying that model. GRA

N86-24784# Imperial Coll. of Science and Technology, London (England). Dept. of Chemical Engineering and Chemical Technology.
OPTICAL STUDIES OF ELECTRICAL DISCHARGE-LIQUID PROPELLANT INTERACTIONS
Fred B. Carleton, George Cherivan, Nathan Klein, and Felix J. Weinberg Jan. 1986 30 p refs
(Contract DAJA45-83-C-0040; DA Proj. 1L2-63627-D-155)
(AD-A164156; BRL-TR-2706) Avail: NTIS HC A03/MF A01 CSCL 21/2

In the course of investigating the ignition of liquid propellants by electrically initiated plasma discharges, it became clear that a number of complex and important processes were taking place within the reaction chamber, commonly called a plasma plug. This report describes the development of transparent plugs that permit optical access to the reaction chamber, and optical and electronic systems for high speed cine schlieren, shadow, and direct photography of events taking place within the cavity. A number of observations are presented and briefly discussed that demonstrate the power and versatility of the equipment. GRA

N86-24785# Illinois Univ., Urbana. Dept. of Chemistry.
TRANSPORT AND RELAXATION PROCESSES IN SUPERCRITICAL FLUIDS Technical Progress Report, 1 Jul. - 30 Sep. 1985
J. Jonas 1985 9 p
(Contract DE-FG22-82PC-50800)
(DE86-002921; DOE/PC-50800/T12) Avail: NTIS HC A02/MF A01

Among the studies presented in this report are: FTIR measurements of solubilities of anthracene in supercritical carbon dioxide, and NMR study of solid naphthalene solubilities in supercritical carbon dioxide near the upper critical end point. Experimental work on transport and relaxation properties of solid-supercritical fluid systems is in progress. DOE

N86-24786# National Bureau of Standards, Gaithersburg, Md.
JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF STANDARDS, VOLUME 90, NUMBER 4, JULY-AUGUST 1985
Aug. 1985 69 p
(PB86-137627) Avail: NTIS HC A04/MF A01 CSCL 07D

This issue of the journal presents articles on many subjects of interest to the NBS. Some representative titles are: Recalibration of the U.S. National Prototype Kilogram; Density compari son of silicon artifacts between NML(Australia) and NBS(U.S.); Mass comparator for in-situ calibration of large mass standards; Determination of the enthalpies of combustion and formation of substituted triazines in an adiabatic rotating bomb calorimeter; Metrics and techniques to measure microcomputer productivity; Field effects on Rydberg atoms; International assembly discusses mechanisms of DNA damage repair; and Microbes play a considerable role in corrosion. E.J.R.

N86-24787# National Bureau of Standards, Gaithersburg, Md. Office of Standard Reference Data.
CHEMICAL THERMODYNAMICS IN STEAM POWER CYCLES DATA REQUIREMENTS
O. Jonas and H. J. White Jul. 1985 291 p refs Proceedings of a workshop held at Gaithersburg, Md., 8-9 Feb. 1983 Sponsored in part by the American Society of Mechanical Engineers, New York and the Electric Power Research Inst., Palo Alto, Calif.
(PB86-130937; NBSIR-85/3205) Avail: NTIS HC A13/MF A01 CSCL 07D

Data needs for chemical thermodynamics in power cycles are examined. The needs of the US power industry for reference data to solve corrosion problems in steam power systems, with emphasis on the thermodynamic data are reviewed. The desirability of establishing a data center to meet these needs are considered. The chemical substances, ranges of parameters, and types of data that should be involved are established. aba

N86-24788# National Bureau of Standards, Gaithersburg, Md. Center for Fire Research.
DATA SOURCES FOR PARAMETERS USED IN PREDICTIVE MODELING OF FIRE GROWTH AND SMOKE SPREAD
D. Gross Sep. 1985 41 p
(PB86-130986; NBSIR-85/3223) Avail: NTIS HC A03/MF A01 CSCL 13L

Sources of data needed for predictive modeling of fire growth by FAST and ASET, two computer codes developed at the Center for Fire Research, are identified for a few selected materials. Data includes thermophysical properties of compartment lining materials and burning rates and combustion product generation rates for typical combustible contents. GRA

N86-24789# Centre d'Essais Aeronautique Toulouse (France).
PES (PLASTICIZER) LEVELS OF A BSL 914 RESIN (CEAT C76 REFERENCE) FROM DIFFERENT STANDARDS
Melle Pavand and M. Harribey 1985 27 p In FRENCH; ENGLISH summary
(PB86-120854; NT-15/M/85) Avail: NTIS HC A03/MF A01 CSCL 07D

In light of the tests which are the subject of the technical note, it is assumed that the various PES samples and all PES (polyether sulfone) contained in the different lots of Resin 914 analyzed at present have the same origin and demonstrate a characteristic CLHP peak. The first results given by the CEAT (PV No. 6977, Partial 1) are confirmed: The analytical method of CLHP of the PES in the special case of Resin 914 associated with an AS4 or T300 fiber seems therefore valuable: The absence of interaction fiber PES allows putting PES in solution and subsequently its CLHP dosage. GRA

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N86-24790 British Library Lending Div., Boston Spa (England).
REASONS FOR LOW PLASTICITY OF STEEL OF TYPE 25-20
N. V. Podobedova, V. P. Ostapenko, and A. V. Rabinovich 1985 4 p refs Transl. into ENGLISH from Izv. VUZ Chernaya Metallurgiya (USSR), 1985, no. 7 p 167-168
(BLL-36604-Ser-M-5828.4) Avail: British Library Lending Div., Boston Spa, Engl.

Despite the implementation of a number of measures recommended in the literature, ingots of grades [10,20] Kh23N18 steel from individual heats have an unsatisfactory deformability. This has necessitated a more detailed study of the reasons for the reduction in the plasticity of the metal and for the development of tears and cracks. Metallographic, X-ray crystallographic, and X-ray spectral analysis revealed that steel with poor deformability contains precipitations of phase containing approx. 38%Cr, approx. 10%Ni, 0.5%Si, 0.5%Mn, remainder Fe. Steel with satisfactory deformability has a single-phase austenitic structure. Using torsion, elongation, rolling, and forging the authors tested longitudinal specimens cut from 30 kg ingots of steel obtained by means of 12 process variants. The Cr/Ni concentration ratio was varied beween 1.23 and 1.47 and the addition of deoxidants (aluminum, REM, zirconium, calcium) was varied. B.W.

N86-24791 British Library Lending Div., Boston Spa (England).
USING REM OXIDES TO MODIFY STEEL
Yu. I. Shish, L. G. Volkov, and Yu. I. Gladilin 1985 4 p refs Transl. into ENGLISH from Izv. VUZ Chernaya Metallurgiya (USSR), no. 8, 1985 p 148-149
(BLL-M-36639-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

It was established that rare earth elements began to have a marked effect on metal quality only when their consumption was increased to 1.5 to 2.0 kg/t steel with a simultaneous rise in the residual content of aluminum from 0.010 to 0.012 to 0.027 to 0.032%, i.e. when the rare earth metal (REM) began to act not so much as a deoxidant than as a modifier. The impact strength of the trial metal at both normal and low (-20 and -40 C) temperatures was 1.5 to 1.7 times higher than that obtained by the usual technology. The sulphur content in the steel after the addition of REM to it fell by 15 to 20%. The macro- and microstructure of the finished steel were improved. E.R.

N86-24792 British Library Lending Div., Boston Spa (England).
SILICON DISTRIBUTION IN SYNTHETIC CAST IRON
V. I. Machikin, A. M. Zborshchik, and A. N. Smirnov 1985 4 p refs Transl. into ENGLISH from Izvestiya VUZ Chernaya Metallurgiya (USSR), no. 9, 1985 p 169-170
(BLL-M-36689-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

An examination is made of the use of additional pulsation agitation of pig iron in the ladle to ensure uniform silicon distribution in synthetic cast iron produced by ladle addition of ferrosilicon.
Author

N86-24793 British Library Lending Div., Boston Spa (England).
EFFECTIVENESS OF LASER TREATMENT OF MATERIALS BY SCANNING BEAM
V. V. Beletskii, A. N. Veremeevich, and A. V. Spivak 1985 4 p refs Transl. into ENGLISH from Izvestiya VUZ Chernaya Metallurgiya (USSR), no. 9, 1985 p 170-171
(BLL-M-36690-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The comparative effectiveness of laser treatment of articles with a scanning and a stationary beam is discussed. Scanning by laser beam improves the output of the process and the uniformity of treatment. Author

N86-24794 British Library Lending Div., Boston Spa (England).
PROPERTIES OF 14Kh17N2 STEEL IN CORROSIVE ENVIRONMENT
V. I. Alimov, V. T. Shiryaev, and V. G. Onoprienko 1985 4 p refs Transl. into ENGLISH from Iz. (USSR), no. 9, 1985 p 171-172
(BLL-M-36691-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Simulation of the conditions experienced by the 14Kh18N2 steel hooks-and-swivels used on trolleys for conveying butcher's meat carcasses (ichor environment) and tensile and impact toughness tests of the steel following subjection to these conditions indicate that 14Kh18N2 steel should be used in the cold-rolled state as it then exhibits higher ductility and toughness properties and there is a lower fraction of brittle component in its fracture. It is also established that the strength of 14Kh18N2 steel is greater than that of the 12Kh18N9T steel used for the same purpose.
Author

N86-24795 British Library Lending Div., Boston Spa (England).
DEPOSITION OF CHROMIUM CARBIDES ON STEEL IN ATMOSPHERE OF CARBON TETRACHLORIDE
V. F. Loskutov, A. F. Terentiev, and V. G. Khizhnyak 1985 4 p refs Transl. into ENGLISH from Izvestiya VUZ Chernaya Metallurgiya (USSR), no. 9, 1985 p 173
(BLL-M-36693-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

X-ray diffraction analysis was used in a study of the influence of the temperature at which carbon tetrachloride is introduced into the reaction chamber atmosphere on the phase composition and thickness of chromium carbide-base coatings applied to steels 20, 45, U8A, and U10A. Author

N86-24796 British Library Lending Div., Boston Spa (England).
MELTING OF SOLID SOLUTION DURING CRYSTALLIZATION OF ALLOY WHITE CAST IRON
Yu. N. Taran, L. M. Snagovskii, and E. Ya. Vastilev 1985 3 p refs
(BLL-M-36677-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The processes of structure formation in white cast irons alloyed with vanadium and chromium are studied. In Fe-C-Cr systems a peritectic-eutectic reaction takes place, the basis of which is the process of breakdown of previously crystallized special carbide and its replacement by alloyed cementite. The breakdown of the special carbide occurs by way of its solution either in the melt or in the adjacent areas of solid solution. In both cases the process results in enrichment of the melt with carbon and alloying element due to the special carbide. After the melt has reached a peritectic composition it crystallizes into ledeburite. This phenomenon is associated with the directed mass transfer of carbon and alloying element through the primary austenite during the peritectic-eutectic reaction. Defects in the crystal lattice then act as traps for atoms of carbon and alloying element and can create the localized concentration of these elements necessary for the described process to occur. It is concluded that part of the so called secondary carbides in iron alloyed with chromium or vanadium are of a crystallization origin. E.R.

N86-24797 British Library Lending Div., Boston Spa (England).
THE THERMODYNAMIC PARTICULARS OF AMORPHOUS COBALT ALLOYS
K. V. Zakharchenko, D. K. Belashchenko, I. B. Kutsenok, and V. A. Geiderikh 1985 6 p refs Transl. into ENGLISH from Izv. VUZ Chernaya Metall., (USSR), 1985 no. 9
(BLLD-5828.4-M-36658) Avail: British Lending Library, Boston Spa, England

The method of instantaneously recording electromotive forces for studying the thermodynamic properties of an amorphous alloy of cobalt containing boron and silicon is presented. The alloy strip was produced by rapid cooling giving it shiny and matt sides, and it was found that the thermodynamic activity of the cobalt was higher at the shiny side. The chemical potential of the cobalt

is characteristically high in the alloys concerned, dropping appreciably when it has initially been annealed at a temperature below that at which solidification begins. Author

N86-24798 British Library Lending Div., Boston Spa (England).
MATHEMATICAL MODEL OF TEMPERATURE CONDITIONS OF COOLING OF METAL DURING PLASTIC DEFORMATION
A. M. Kushnir and E. I. Kazantsev 1985 10 p refs Transl. into ENGLISH from Izvestiya VUZ Chernaya Metallurgiya (USSR), no. 9, p 81-86
(BLLD-5828.4-M-36663) Avail: British Library Lending, Boston Spa, England

Analytical solution of the heat conduction problem is given for an unlimited uniformly deformed plate, with the problem formulated in dimensionless criterion form. Obtained dependences can be used to model the temperature state of plastically deformed bodies in a wide range of processes of mechanical working of metals. Author

N86-24799 British Library Lending Div., Boston Spa (England).
METHOD OF PRODUCING A THREE-DIMENSIONAL COORDINATE GRID
O. I. Shavrin, V. B. Dementev, and N. A. Kokorin 1985 5 p refs Transl. into ENGLISH from Izv. VUZ Chernaya Metall. (USSR), no. 9
(BLLD-5828.4-M-36664) Avail: British Library Lending, Boston Spa, England

The three dimensional coordinate grid developed consists of a billet made up on concentric cylinders with different diameters in the form of alternate layers of metals similar in physical and mechanical properties to, but differing in etchability from the metal of the investigated billet with wire made of a metal differing in physical and mechanical properties from the materials of the cylinders threaded in longitudinal grooves cut every 60 degrees around the outside surfaces of the cylinders. Use of the given method of preparing a three dimensional coordinate grid increases the accuracy of determination of the deformation parameters throughout the volume of the specimen owing to the fact that the dimensions of the coordinate grid remain constant and the fact that the strong mutual welding of the cylinders in the specimen enable it to be used as a continuous (monolithic) specimen. Author

N86-24800 British Library Lending Div., Boston Spa (England).
COMPACTING KINETICS OF METAL POWDERS DURING PRESSING
V. G. Bakhtin, P. I. Polukhin, and A. B. Kudrin 1986 6 p refs Transl. into ENGLISH from Izvestiya (USSR), no. 9,1985 p 97-100
(BLLD-5828.4-M-36666) Avail: British Library Lending, Boston Spa, England

It is demonstrated that the compacting kinetics of a powder material can be investigated by the method of holographic interferometry employing a special die rig with a front glass wall of special material and thickness to ensure the conditions of the plane problem, i.e. no loss of flatness by the powder, for the stepwise production of holographic interferograms. It was established that change in the main compacting mechanism of a powder material during pressing results in a change in the nature of the three dimensional distribution of the deformations in the investi gated briquette. Author

N86-24801 British Library Lending Div., Boston Spa (England).
THE HEAT TREATMENT OF Ti-Al-V SYSTEM ALLOY FOIL PRODUCED BY VACUUM PRECIPITATION
Ya. B. Ulanovskii, Yu. A. Skakov, and G. I. Dubnik 1986 9 p refs Transl. into ENGLISH from Izvestiya VUZ Chernaya Metall. (USSR), no. 9, 1985 p 112-115
(BLLD-5828.4-M-36668) Avail: British Library Lending, Boston Spa, England

The effects of heat treatment on the structure and properties of Ti-3Al-2V and Ti-6Al-4V alloy foil produced by vacuum precipitation are discussed. The base strip and annealing temperatures providing the best results are detailed. Author

N86-24802 British Library Lending Div., Boston Spa (England).
HEAT TREATMENT OF TOOL JOINTS FOR DRILL PIPES
M. N. Lobanov, V. A. Korotkov, and I. A. Tolstov 1986 6 p refs Transl. into ENGLISH from Izvestiya VUZ (USSR), no. 9, 1985 p 127-128
(BLLD-5828.4-M-36669) Avail: British Library Lending, Boston Spa, England

The authors determined the mechanical properties of 40KhN steel after normal and isothermal quenching to compare strength and ductility owing to the tendency of hardened threads to fracture in service. Isothermal quenching resulted in higher impact strength for constant static and fatigue strength than normal quenching. A heat treatment schedule is described for improving the seizing resistance and fracture strength of tool joint threads. Author

N86-24803 British Library Lending Div., Boston Spa (England).
INFLUENCE OF LIME ADDITIONS ON SILICOTHERMIC REDUCTION OF TITANIUM
Yu. A. Deryabin, L. A. Smirnov, and A. V. Mukhacheva 1986 4 p refs Transl. into ENGLISH from Izvestiya VUZ Chernaya Metallurgiya (USSR), no. 8, 1985 p 147-148
(BLLD-5828.4-M-36638) Avail: British Library Lending, Boston Spa, England

A study was made of the processes of silicothermic reduction of titanium from slags of the melting of Kachkanar pellets. Titanium slag was mixed with ferrosilicon and lime and heated in graphite crucibles in a Tamman furnace until complete meltdown of the charge. After isothermal holding, the crucible was removed from the furnace and cooled in air.The influence of the ferrosilicon and lime contents of the charge on the concentration of titanium in the complex metallic alloy was established. Author

N86-24804 British Library Lending Div., Boston Spa (England).
DEGREE TO WHICH NATURAL GAS IS DISSOCIATED DURING THERMAL OXIDATION PYROLYSIS
G. V. Vornov, L. I. Prudnikova, V. A. Nyrko, E. G. Zorin, and N. N. Eremeeva 1986 8 p refs Transl. into ENGLISH from Izvestiya (USSR), p 111-113
(BLL-M-36630-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

To simplify calculation of the dissociation of natural gas during thermal dioxidizing pyrolysis, the authors consider that all heavy hydrocarbons should be represented as equivalent amounts of methane; natural gas is then regarded as a mixture of methane to which N2, CO2, etc. have been added as ballast. The assumption can only be made in the case of natural gas. The calculations described make it possible to evaluate the highest temperature for the thermal dissociation of methane for prescribed values of the temperature of the products of thermal oxidizing pyrolysis and the coefficient of consumption of air. Author

N86-24805 British Library Lending Div., Boston Spa (England).
INFLUENCE OF PARAMETERS OF MICROSTRUCTURE ON PROCESS OF HOT DEFORMATION OF TWO-PHASE STEEL
A. N. Rostovtsev, L. P. Laricheva, V. N. Peretyatko, and A. M. Levius 1986 7 p refs Transl. into ENGLISH from Izvestiya (USSR), no. 8, 1985 p 40-42
(BLL-M-36626-(5828.4)) Avail: British Library Lending Div., Boston Spa, England

The influence of the stereological parameters of microstructure on the plastic deformation process of a two phase steel is investigated mathematically. Refinement of the austenite grain, decrease in the energy of the packing defects and increase in the combination level of the austenite result in high-temperature work hardening of the austenite in a steel with a small amount of delta-ferrite. Increase in the area of the interphase surface results in an increase in the degree of softening. Author

N86-24806 British Library Lending Div., Boston Spa (England).
ENTHALPIES OF MIXING OF ALKALINE-EARTH METALS WITH IRON AND NICKEL
E. D. Pletneva, Yu. O. Esin, V. V. Litovskii, and S. E. Demin 1986 7 p refs Transl. into ENGLISH from Izvestiya VUZ Chernaya

Metallurgiya (USSR), no. 8, 1985 p 10-12
(BLLD-5828.4-M-36625) Avail: Bristish Library Lending Div., Boston Spa, Engl.

The Kohler and Gromakov methods were used to estimate the integral enthalpies of formation of liquid alloys Fe-Ca, Fe-Ba, Ni-Ca, and Ni-Ba. These binary systems were examined as components of the ternary systems Fe-Si-Ca, Fe-Si-Ba, Ni-Si-Ca, and Ni-Si-Ba. Results of experimental calorimetric investigations of the concentration dependences of the enthalpies of formation of liquid alloys are discussed. Author

N86-24807 British Library Lending Div., Boston Spa (England).
THERMOKINETIC DIAGRAM OF EMBRITTLEMENT OF MARAGING STEEL 03N18K9M5T-VD
Yu. G. Andreev, V. N. Tolstikov, and O. K. Revyakina 1986 4 p refs Transl. into ENGLISH from Izvestiya VUZ Chernaya Metallurgiya (USSR), no. 8, 1985 p 156-157
(BLLD-5828.4-M-36648) Avail: Bristish Library Lending Div., Boston Spa, Engl.

The influence of cooling rate in the temperature range 750-1200C on the degree of embrittlement of maraging steel 03N18K9M5T-VD was studied with the aim of plotting the thermokinetic diagram of the process. The influence of the steel-making method and the carbon content of the steel on the kinetics and degree of embrittlement was also determined. Author

N86-24808 British Library Lending Div., Boston Spa (England).
INFLUENCE OF OXIDATION ON COEFFICIENT OF HYDROGEN DIFFUSION IN MERAGING STEELS
V. V. Lobanov, M. G. Svidorov, and N. P. Zvonareva 1986 3 p Transl. into ENGLISH from Izvestiya VUZ Chernaya Metall. (USSR), no. 8, 1985 p 155-158
(BLL-M-36647-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The influence of the oxidizing time and the thickness of scale were examined in VNS-2M steels. The kinetics of scale formation was studied on flat control specimens. B.G.

N86-24809 British Library Lending Div., Boston Spa (England).
INFLUENCE ON WEAR OF TRANSLATIONAL VELOCITY OF SPECIMENS DURING LASER BORIZING OF STEEL
L. S. Lyakhovich, S. A. Isakov, and V. M. Kartoshkin 1986 3 p Transl. into ENGLISH from Izvestiya VUZ Chernaya Metall. (USSR), no. 8, 1985 p 155
(BLL-M-36646-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

For comparison of the degrees of wear, specimens borized in furnaces under conditions ensuring the attainement of monophase (Fe2B) and two phase (FeB, Fe2B) layers were worn under the same conditions. The degree of wear was determined as the arithmetic mean of 6 trials. Two factors were found to positively influence the degree of specimen wear: burning up of the boron and the phase composition of the layer. The pattern of wear is the same for specimens after furnace borizing. B.G.

N86-24810 British Library Lending Div., Boston Spa (England).
INFLUENCE OF ANNEALING TEMPERATURE ON DUCTILE PROPERTIES OF STEEL WIRE
V. I. Alimov, B. Kabrera, and A. P. Shtykhno 1986 4 p refs Transl. into ENGLISH from Izvestiya VUZ Chernaya Metallurgiya (USSR), no. 8, 1985 p 153-154
(BLL-M-36645-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The ductile properties of fine steel wire after annealing in a wide temperature range were studied through an evaluation of the number of bends and twists to fracture. The investigations were carried out on 0.9 mm diameter wire prepared from sections of 3.0 mm diameter semi of high alloy steel 75 (0.74% C) and on samples of wire of the same diameter taken from a normalized semi of low alloy steel 10 (0.09% C). Annealing was carried out two months after drawing at a range of temperatures between 125 and 700 C with a heating time of 1 h. Annealing at temperatures not exceeding 300 C either maintains or slightly increases the number of bends and twists that the wire of both grades of steel can withstand. A higher annealing temperature (300 to 500 C) leads to a drop in the values of these properties for the high carbon steel 75, whereas for the low carbon steel 10 over this temperature range there is a continuous increase in the ductile properties. At annealing temperatures above 500 C the number of bends and twists varies non-monotonically owing to the ambiguous influence of grain size and type and the type of cementite. M.G.

N86-24811 British Library Lending Div., Boston Spa (England).
STUDY OF PHASE DISTRIBUTION IN UNSTABLE AUSTENITE STEEL USING THERMOELECTROMOTIVE FORCES
A. N. Bogomolov, V. R. Baraz, and A. N. Makhankov 1986 4 p refs Transl. into ENGLISH from Izvestiya VUZ Chernaya Metall. (USSR), no. 8, 1985 p 152-153
(BLL-M-36644-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The method of measuring thermoelectromotive forces U is known to be one of the most sensitive in the study of phase transformations in metallic alloys and it can be used for solving particular tasks in metal science. In the present work the authors consider the influence of plastic deformation on variation in the thermoelectromotive force over the cross section of 2 mm dia. wire specimens of 12Khs17N8G2S2MF unstable austenitic steel. The steel was quenched form 1080 deg C and suquently drawn with an overall reduction of 85%. Some of the specimens were tested in the quenched (purely austenitic) state. For comparison, a parallel study was made of 13Kh18N10G3S2M2 stable austenitic steel subjected to the same treatment process. The measurements were carried out on a unit with a tungsten probe with a temperature difference of 100 deg between the hot and cold contacts. The specimens were subjected to electrolytic polishing to remove the work hardened layer that had formed during their preparation. It should be noted that the residual stresses can themselves have a certain influence on the thermoelectromotive force, but in the present case the main factor is the change in the phase composition of the deformed steel. Author

N86-24812 British Library Lending Div., Boston Spa (England).
MAGNETIC SUSCEPTIBILITY OF Fe-Cr-O ALLOYS
V. E. Sidorov, V. S. Gushchin, and B. A. Baum 1986 4 p refs Transl. into ENGLISH from Izvestiya VUZ Chernaya Metall. (USSR), no. 8, 1985 p 152
(BLL-M-36643-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

In the present work the Faraday method was used to study the magnetic susceptibility chi of Fe-Cr-O alloys in the range of chromium contents from 0 to 2% and of oxygen concentrations from 0.002 to 0.07%, in the temperature range 1000-1800 deg C. The measurements were made in an atmosphere of high-purity helium in alumina crucibles. The error in determining absolute values of chi did not exceed + or - 19%. The specimens were subjected to chemical analysis for chromium and oxygen before and after the experiments. It was revealed that the chromium concentration scarcely varied during the experiments, but the oxygen content fell on average by 5-7% from the initial value. The results of the measurements are presented. A strong non-additive influence of chromium on the magnetic properties of the iron is revealed. Author

N86-24813*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
APPLICATION OF AN ATMOSPHERIC PRESSURE SAMPLING MASS SPECTROMETER TO CHLORINATION REACTIONS
Nathan S. Jacobson 1986 20 p refs Presented at the 115th TMS-AIME Annual Meeting, New Orleans, La., 2-6 Mar. 1986; sponsored by Metallurgical Society
(NASA-TM-87270; E-2888; NAS 1.15:87270) Avail: NTIS HC A02/MF A01 CSCL 11F

An atmospheric pressure mass spectrometric sampling system, based on a free jet expansion was used to study certain M-Cl-O reactions at high temperatures. The apparatus enables

the volatile species from a 1-atm chemical process to be directly identified with a mass spectrometer which operates at approx. 10 to the minus 8th power torr. Studies for both pure metals and alloys are discussed. It is shown that this mass spectrometer system aids in identifying the volatile species, and provides fundamental information on the reaction mechanism. E.A.K.

N86-24814*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DIFFUSION OXYGEN BARRIER COATING A02/MF A01 Patent Application
Jalaiah Unnam, inventor (to NASA) (Analytical Services and Materials, Inc., Tabb, Va.) and Ronald Keith Clark, inventor (to NASA) Filed 18 Mar. 1986 15 p
(NASA-Case-LAR-13474-1-SB; NAS 1.71:LAR-13474-1-SB; US-Patent-Appl-SN-840900) Avail: NTIS HC A02/MF A01 CSCL 11F

A method for coating a titanium panel or foil with aluminum and amorphous silicon to provide an oxygen barrier abrogating oxidation of the substrate metal is developed. The process is accomplished with known inexpensive procedures common in materials research laboratories, i.e., electron beam disposition and sputtering. The procedures are conductive to treating foil gage titanium and result in submicron layers which virtually add no weight to the titanium. There are no costly heating steps. The coatings blend with substrate titanium until separate mechanical properties are subsumed by those of the substrate eliminating cracking and spallation. This method appreciably increases the ability of titanium to perform in high thermal environments such as those witnessed on structures of space vehicles during re-entry. The novelty of this method is the ability to greatly enhance the operating envelope of titanium metal, particularly in thermal protection system applications. Author

N86-24815*# National Aeronautics and Space Administration, Washington, D.C.
ANISOTROPY OF HIGH TEMPERATURE STRENGTH IN PRECIPITATION-HARDENED NICKEL-BASE SUPERALLOY SINGLE CRYSTALS
Y. G. Nakagawa, H. Terashima, H. Yoshizawa, Y. Ohta, and K. Murakami Mar. 1986 25 p refs Transl. into ENGLISH from Ishikawajima-Harima Engineering Review (Japan), v. 25, Jan. 1985 p 5-10 Original language doc. was announced in IAA as A85-38443 Transl. by Kanner (Leo) Associates, Redwood City,iCalif.
(Contract NASw-4005)
(NASA-TM-88387; NAS 1.15:88387; ISSN-0578-7904) Avail: NTIS HC A02/MF A01 CSCL 11F

The anisotropy of high temperature strength of nickel-base superalloy, Alloy 454, in service for advanced jet engine turbine blades and vanes, was investigated. Crystallographic orientation dependence of tensile yield strength, creep and creep rupture strength was found to be marked at about 760C. In comparison with other single crystal data, a larger allowance in high strength off-axial orientation from the 001 axis, and relatively poor strength at near the -111 axis were noted. From transmission electron microscopy the anisotropic characteristics of this alloy were explained in terms of available slip systems and stacking geometries of gamma-prime precipitate cuboids which are well hardened by a large tantalum content. 100 cube slip was considered to be primarily responsible for the poor strength of the -111 axis orientation replacing the conventional 111 plane slip systems.
Author

N86-24816*# National Aeronautics and Space Administration, Washington, D.C.
CONTRIBUTION TO THE STUDY OF THE ELECTRIC ARC: EROSION OF METALLIC ELECTRODES Thesis
A. Castro May 1986 67 p refs Transl. into ENGLISH of "Contribution a l'Etude de l'Arc Electrique. Erosion des Electrodes Metalliques" Paris XI (Orsay, France), 12 Jan. 1978 p 1-82 Presented at Annual Convention of the German Aerospace Society, Hamburg, West Germany, 1-3 Oct. 1984; Sponsored by Deutsche Gesellschaft fuer Luft- und Raumhafrt Original language document was previously announced in IAA as A79-23426 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-4005)
(NASA-TM-77855; NAS 1.15:77855) Avail: NTIS HC A04/MF A01 CSCL 11F

A procedure is described for determining the extent of arc electrode erosion (excluding erosion due to transfer of material) from measurements of emitted spectral beam intensity. The relation between emission intensity and plasma temperature is ascertained. Experimental study of several combinations of monometallic electrodes shows that the method is suitable for determining cathode erosion, although the anode metal affects the extent of erosion. Combinations of electrodes which lead to low erosion of silver are reported. M.L.

N86-24817# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Metallurgy and Materials Science.
CORROSION OF NICKEL AND COBALT BASE ALLOYS IN SULFATE MELTS AT 750 DEG C Final Report
Ajay K. Misra Apr. 1986 31 p refs Presented at the 169th Meeting of the Electrochemical Society, Boston, Mass., 4-9 May 1986
(Contract NCC3-43)
(NASA-CR-175111; E-3035; NAS 1.26:175111) Avail: NTIS HC A03/MF A01 CSCL 11F

The corrosion of Ni, Co, plus several nickel and cobalt-base alloys was studied at 750 C in the presence of molten sulfate mixtures and in an atmosphere consisting of O2 + 0.12% SO2+SO3. The melt system selected were Na2SO4-Li2SO4 and Na2SO4-CoSO4. The corrosion of pure metals took place by the formation of a mixed oxide plus sulfide scale. A mixed oxide plus sulfide of the base metal is also formed during the initial stage of corrosion of the alloys; however, subsequently a Cr rich sulfide is formed underneath the outer base metal rich scale. With time, the outer part of the inner scale oxidizes to an oxide and more sulfides are formed beneath the oxide. The inner scale is formed as a continuous layer for the low Cr containing alloys and the inner scale is formed in localized sites in the form of pits for the higher Cr containing alloys. Author

N86-24818*# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
THERMAL-MECHANICAL FATIGUE BEHAVIOR OF NICKEL-BASE SUPERALLOYS Final Report
R. M. Pelloux and N. Marchand Mar. 1986 186 p refs
(Grant NAG3-280)
(NASA-CR-175048; NAS 1.26:175048; USAAVSCOM-TR-86-C-4) Avail: NTIS HC A09/MF A01 CSCL 11F

The main achievements of a 36-month research program are presented. The main objective was to gain more insight into the problem of crack growth under thermal mechanical fatigue (TMF) conditions. This program was conducted at M.I.T. for the period of September 1982 to September 1985. The program was arranged into five technical tasks. Under Task I, the literature of TMF data was reviewed. The goal was to identify the crack propagation conditions in aircraft engines (hot section) and to assess the validity of conventional fracture mechanics parameters to address TMF crack growth. The second task defined the test facilities, test specimen and the testing conditions needed to establish the effectiveness of data correlation parameters identified in Task I. Three materials (Inconel X-750, Hastelloy-X, and B-1900) were chosen for the program. Task II was accomplished in collaboration with Pratt & Whitney Aircraft engineers. Under Task III, a computerized testing system to measure the TMF behavior (LCF and CG behaviors) of various alloys systems was built. The software used to run isothermal and TMF tests was also developed. Built around a conventional servohydraulic machine, the system is capable of push-pull tests under stress or strain and temperature controlled conditions in the temperature range of 25C to 1050C. A crack propagation test program was defined and conducted under Task IV. The test variables included strain range, strain rate (frequency) and temperature. Task V correlated and generalized the Task IV data for isothermal and variable temperature

conditions so that several crack propagation parameters could be compared and evaluated. The structural damage (mode of cracking and dislocation substructure) under TMF cycling was identified and contrasted with the isothermal damage to achieve a sound fundamental mechanistic understanding of TMF. Author

N86-24819# Sandia National Labs., Albuquerque, N. Mex.
MICROSTRUCTURES OF SURFACE-MELTED ALLOYS
D. M. Follstaedt and S. T. Picraux 1985 86 p Presented at the ASM Metals Congress, International Conference on Surface Modifications, Toronto, Ontario, Canada, 13 Oct. 1985
(Contract DE-AC04-76DP-00789)
(DE86-002916; SAND-85-1961C; CONF-8510160-8) Avail: NTIS HC A05/MF A01

The microstructures formed by rapid melting and solidification of surface alloys on metal substrates are described for fast laser and electron beam heating. Primary emphasis is placed on developing a general perspective on the materials science of rapid solidification. Surface melting produces controllable and calculable thermal histories, which allow quantitative evaluation of kinetic and thermodynamic alloy parameters affecting the microstructures produced by rapid solidification. The heating and cooling rates obtainable with surface melting (up to 10 to the 10th power K/s) allow faster quenching regimes to be examined. The wide range of microstructures which can be accessed by surface melting is illustrated in turn for pure metals, ion-implanted surface alloys, deposited layer alloys and engineering alloys. DOE

N86-24820# Michigan Technological Univ., Houghton. Dept. of Metallurgical Engineering.
ADVANCED PROCESSING AND PROPERTIES OF HIGH PERFORMANCE ALLOYS Annual Report, 1 Oct. 1984 - 30 Sep. 1985
Donald A. Koss 29 Nov. 1985 19 p refs
(Contract N00014-85-K-0427)
(AD-A163469; TR-3) Avail: NTIS HC A02/MF A01 CSCL 11/6

Progress is reviewed for a research whose purpose is to provide a fundamental understanding of the applications and consequences of selected advanced processing techniques to high performance alloys. The research ranges from modelling studies of the fracture of alloys containing porosity to the high temperature deformation of rapidly solidified, dispersion-strengthened titanium alloys. Many aspects of the research are also fundamental studies of fracture utilizing engineering alloys containing processing-induced defects. Progress for the period October 1, 1984 to September 30, 1985 is reviewed for the following studies comprising this research program: (1) the influence of void/pore distributions on ductile fracture; (2) the effect of porosity on low cycle fatigue; (3) hot isostatic pressing of metallic powders; (4) deformation of rapidly solidified Ti alloys at elevated temperatures; and (5) the combined effect of stress state and grain size on hydride-induced hydrogen embrittlement. Author (GRA)

N86-24821# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
CONSTANT-LOAD-AMPLITUDE FATIGUE CRACK GROWTH TESTING OF CAST ALUMINUM ALLOYS A201-T7 AND A357-T6 Final Report, Mar. 1983 - Apr. 1984
J. D. Tirpak Nov. 1985 60 p refs
(AD-A163494; AFWAL-TR-85-4096) Avail: NTIS HC A04/MF A01 CSCL 11/6

This report is a repository of constant-load-amplitude fatigue crack growth rate data for cast aluminum alloys A201-T7 and A357-T6. Conditions were R=0.1, room temperature, lab air, and growth rates were above .0000001 m/cycle. The data herein was published for use by the aerospace community. From this data, it appears as if cast aluminum alloys possess some variability with respect to fatigue crack growth rate. For the most part though, the data is to serve as a nucleus for evaluating fatigue and fracture data for aluminum casting alloys, and generating impetus for further evaluation of these alloys with respect to fracture. GRA

N86-24822# Integrated Systems Analysts, Inc., National City, Calif.
CORROSION-CONTROL (CC) PROGRAM SIMA (SHORE INTERMEDIATE MAINTENANCE ACTIVITY) PILOT CC (CORROSION-CONTROL) SHOP SERVICE TEST AND TECHNICAL SUPPORT. VOLUME 1. SECTIONS 1 TO 8 Final Report, 1 Aug. - 30 Nov. 1985
W. Adkins, S. Kullerd, C. McPherron, M. Miller, and O. OBrien 30 Nov. 1985 175 p refs
(Contract N66001-85-C-0350)
(AD-A163670; ISA(WC)-107-Vol-1) Avail: NTIS HC A08/MF A01 CSCL 11/6

The objective of the SIMA Corrosion-Control Program was to develop a functional and production capability for SIMAs to deliver and support corrosion-control coating systems being used by the Navy in new construction ships and in the maintenance, repair and overhaul of ships in service. The results of the one-year Service Test of the SIMA San Diego Pilot Corrosion Control Shop at SIMAs are presented. The one-year Service Test was completed on 30 November 1985. The establishment and operation of the Pilot Shop are summarized. For the Production Shop, recommendations are included for organization, manning, equipment, shop operation, shipboard operation, installation kits, planning and training to implement the establishment of a SIMA Production Shop. GRA

N86-24823# Integrated Systems Analysts, Inc., National City, Calif.
CORROSION-CONTROL (CC) PROGRAM SIMA (SHORE INTERMEDIATE MAINTENANCE ACTIVITY) PILOT CC (CORROSION-CONTROL) SHOP SERVICE TEST AND TECHNICAL SUPPORT. VOLUME 2: APPENDICES A3, A4, A6, A8 Report, 1 Aug. - 30 Nov. 1985
W. Adkins, S. Kullerd, C. McPherron, M. Miller, and O. OBrien 30 Nov. 1985 390 p refs
(Contract N66001-85-C-0350)
(AD-A163671; ISA(WC)-107-Vol-2) Avail: NTIS HC A17/MF A01 CSCL 11/6

The objective of the SIMA Corrosion-Control Program was to develop a functional and production capability for SIMAs to deliver and support corrosion-control coating systems being used by the Navy in new construction ships and in the maintenance, repair and overhaul of ships in service. Appendices a3, a4, a6, and a8 are given. GRA

N86-24824# Integrated Systems Analysts, Inc., National City, Calif.
CORROSION-CONTROL (CC) PROGRAM SIMA (SHORE INTERMEDIATE MAINTENANCE ACTIVITY) PILOT CC (CORROSION-CONTROL) SHOP SERVICE TEST AND TECHNICAL SUPPORT. VOLUME 3: APPENDIX A7 Report, 1 Aug. - 30 Nov. 1985
W. Adkins, S. Kullerd, C. McPherron, M. Miller, and O. OBrien 30 Nov. 1985 303 p refs
(Contract N66001-85-C-0350)
(AD-A163672; ISA(WC)-107-Vol-3) Avail: NTIS HC A14/MF A01 CSCL 11/6

The objective of the SIMA Corrosion-Control Program was to develop a functional and production capability for SIMAs to deliver and support corrosion-control coating systems being used by the Navy in new construction ships and in the maintenance, repair and overhaul of ships in service. Appendix A7 is given. GRA

N86-24825# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
RELYING ON PROGRESS OF TECHNOLOGY, TO DEVELOP OUR ALLOY STEEL
Dong Yang 3 Jan. 1986 18 p refs Transl. into ENGLISH from Gangtie (China), v. 18, no. 8, Aug. 1983 p 1-6
(AD-A163690; FTD-ID(RS)T-0927-85) Avail: NTIS HC A02/MF A01 CSCL 11/6

Since the establishment of the new People's Republic of China, the national production of alloy steel as well as the technology development have improved very much from almost nonexistent to current status. The annual yield of alloy steel increased from two to three thousand tons in 1949 to the maximum production of two and a half million tons in 1979. We have now more than

six hundred alloy steel products. Basic types such as plate, pipe, wire, belt, cake, ring and shape are complete. The quality of alloy steel has improved significantly in recent years also. One hundred and twenty three types of alloy steel products have been recognized to meet national, ministry, province and municipal standards. However, when compared with the requirement of continuous development for national economy and other advanced industrial countries' standards, there still remains quite a gap. Therefore, it is our honor and difficult responsibility to develop a new era of alloy steel production. This work also meets the instruction of Premier Chao to advance our nation's industries of alloy steel and low alloy steel. GRA

N86-24826 Department of the Air Force, Washington, D.C.
METHOD TO REVEAL MICROSTRUCTURES IN SINGLE PHASE ALLOYS Patent
Isaac Weiss, inventor (to Air Force), Francis H. Froes, inventor (to Air Force), and Daniel Eylon, inventor (to Air Force) Issued 20 Mar. 1986 5 p
(AD-D012020; US-Patent-4,548,903; US-Patent-Appl-SN-595153; US-Patent-Class-436-5) Avail: US Patent and Trademark Office CSCL 11/6

A method for revealing the microstructure of metal alloys comprises the steps of polishing the sample, chemically etching the polished metal surface, thermally etching the chemically etched surface and quenching the thermally etched sample. This method allows observation of deformed and recrystallized grains on the same polished surface and provides the opportunity to correlate recrystallized grains to their nucleation sites. GRA

N86-24827# Northwestern Univ., Evanston, Ill. Dept. of Materials Science and Engineering.
SYNTHESIS AND PROPERTIES OF ELEVATED TEMPERATURE P/M ALUMINUM ALLOYS Final Report, 1 Oct. 1981 - 30 Sep. 1985
Morris E. Fine and Julia R. Weertman 30 Nov. 1985 114 p refs
(Grant AF-AFOSR-0005-82)
(AD-A164158; AFOSR-85-1258TR) Avail: NTIS HC A06/MF A01 CSCL 11/6

The microstructure of the aluminum base-iron-cerium and iron-molybdenum-vanadium alloys, which were developed for use up to 316 degrees centigrade, is not stable at 425 degrees centigrade (three-quarters of the absolute melting temperature of aluminum). Metastable dispersed phases are replaced by stable phases and particles of these coarsen rather rapidly with time. Creep loading accelerates these processes. Trialuminum-zirconium was predicted to be a preferable dispersed phase for strengthening aluminum for the 425 C temperature range because of good lattice matching with the aluminum matrix giving a low interfacial energy. This is true for the thermodynamically stable tetragonal phase but especially true for the metastable cubic phase. Dilute alloys were prepared by arc melting and these were aged to form precipitate dispersed phase. Substitution of vanadium for zirconium improved the lattice parameter matching for both cubic and tetragonal trialuminum-zirconium as well as increasing the stability of the cubic form. The coarsening rates of the particles at 425 C were 100 to 1000 times slower than for the aluminum-iron-cerium or molybdenum alloys, the aluminum-zirconium-vanadium alloy being better than the binary aluminum-zirconium alloy in this respect. These alloys are very pr omising as the basis for better high temperature aluminum alloys. Author (GRA)

N86-24828# Illinois Univ., Urbana. Dept. of Electrical and Computer Engineeri
NON-LINEAR OPTICAL TECHNIQUES FOR VISIBLE AND UV LASERS AND THIN FILM DEPOSITION Final Report, 1 Oct. 1984 - 30 Sep. 1985
J. G. Eden Nov. 1985 18 p refs
(Contract F49620-83-C-0003)
(AD-A164188; AFOSR-85-1222TR) Avail: NTIS HC A02/MF A01 CSCL 07/5

Thin metal films have been deposited by a multiphoton ionization technique. Laser-initiated semiconduct thin-film growth has been demonstrated and laser irradiation of the substrate has produced higher quality films than that obtained by growth without the laser. Also, laser induced breakdown (LIB) has been shown to be a highly sensitive technique for detecting minute impurities. In addition, a significant improvement in XeCl laser energy output has been realized by the injection of a low intensity UV laser pulse into the XeCl laser cavity. GRA

N86-24829# Naval Research Lab., Washington, D. C.
CRACKING RESISTANCE IN A 4.5-INCH (114-MM) PLATE OF 7075-T7351 ALUMINUM ALLOY Final Report
G. R. Yoder, L. A. Cooley, T. J. Watson, and T. W. Crooker 12 Dec. 1985 49 p refs
(AD-A164229; NRL-MR-5699) Avail: NTIS HC A03/MF A01 CSCL 11/6

After an anodizing treatment, peculiarities were observed in the appearance of structural components for the Space Shuttle, thought to be indicative of flaws in the Al-7075-T7351 material. Consequently, work was undertaken to explore structural integrity aspects of this material as well as the nature of any material defects. The material contains a number of macro- and microstructural inhomogeneities which could be classed as defects or potential crack-like defects, viz. stringers of brittle constituent particles, shrinkage cavities, and in one instance, a long line of sponge-like porosity. Nonetheless, uniaxial strength level was found to exceed design requirements. Similarly, results for cracking resistance- in terms of fracture toughness, fatigue crack growth rates (DA/DN) and rotating beam fatigue life (S/N), appear to meet or exceed handbook levels. However, the very largest defects are so infrequently observed that their presence in the crack tip process zone of an individual fracture mechanics specimen is something less than likely. The unusual macroappearance of anodized components may be attributable to entrapment of anodizing solution by microshrinkage cavities and/or microcracks along constituent particle stringer interfaces, with subsequent seepage and staining adjace nt to these and/or other flaws. GRA

N86-24830# Georgia Univ., Athens. Dept. of Chemistry.
METAL CLUSTER TOPOLOGY. PART 3: PLATINUM CARBONYL CLUSTERS
R. B. King 29 Jan. 1986 24 p refs
(Contract N00014-85-K-0365)
(AD-A164241; TR-17) Avail: NTIS HC A02/MF A01 CSCL 07/4

Previously discussed topological models of metal cluster bonding are now extended to the treatment of stacked platinum carbonyl clusters, whose structure and bonding exhibit a variety of new features. The stacked triangle cluster dianions Pt3k(CO) 6k(2-) (k=2,3,4,5) are best regarded as built from edge-localized bonds with additional Mobius delocalization on both the top and bottom triangles of the stack. These stacked triangles thus appear to be the first examples of stable chemical species having planar rings of atoms exhibiting Mobius rather than untwisted Huckel delocalization. Such Mobius delocalization can naturally arise from the phase changes of appropriated orbitals of each of the platinum atoms in the top and bottom triangles of the stack. The more complicated tetraanion Pt19(CO)22(4-) can be regarded structurally as a threaded tube in which a Pt15 stack of three pentagons is the tube and a Pt4 chain is the thread. Edge-localized bonding is then seen to occur within both the Pt15 stack (25 edges) and the Pt4 thread (3 edges) with additional delocalized bonding within the pentagonal pyramidal chambers at each end of the stack. These seemingly rather exotic topological bonding models are consistent with the general principles of metal cluster bonding and reproduce exactly the observed electron counts for the stacked platinum carbonyl clusters. GRA

N86-24831# Argonne National Lab., Ill.
STRUCTURAL STUDY OF MULTILAYERED VANADIUM/NICKEL SUPERLATTICES
Hitoshi Homma, Yves Lepetro, James M. Murduck, Ivan K. Schuller, and C. F. Majkrzak (Brookhaven National Lab., Upton, N.Y.) Jul.

1985 7 p refs Presented at the SPIE 29th Annual International Technical Symposium on Applications of Thin-Film Multilayered Structures to Figured X-Ray Optics, San Diego, Calif., 18-23 Aug. 1985 Sponsored in part by DOE
(Contract N00014-83-F-0031)
(DE85-018396; CONF-850887-38) Avail: NTIS HC A02/MF A01

The microstructure of V/Ni metallic superlattice was studied by using X-ray and neutron diffraction. A sharp and broad rocking curve around the first order Bragg peak was found, which is attributed to a columnar structure which gives rise to two modulation structures: one the ordinary layered structure within the columns and the other the averaged modulation structure which produces the sharp rocking peak. E.A.K.

N86-24832# California Univ., Berkeley. Lawrence Berkeley Lab.
ACCURATE STURCTURE FACTOR DETERMINATION OF BINARY CUBIC SOLID SOLUTIONS
A. G. Fox and R. M. Fisher 15 Apr. 1986 6 p Presented at the Electron Microscopy and Analysis Group Conference, Newcastle-Upon-Tyne, England, 2 Sep. 1985 Prepared in cooperation with Wolverhampton Polytechnic, Engl.
(Contract DE-AC03-76SF-00098)
(DE86-002891; LBL-19947; CONF-8509168-3) Avail: NTIS HC A02/MF A01

The Critical Voltage technique (V(sub C)) in HEED can measure low angle X-ray structure factors of crystalline materials to within 0.1% provided accurate higher angle structure factors and Debye-Waller factors are available. The extension of this technique to a range of alloys in the systems CuAu, CuAl and FeCr is presented. DOE

N86-24833 United Kingdom Atomic Energy Authority, Harwell (England). Materials Development Div.
TRANSVERSE MICROSECTIONS OF THIN OXIDE SCALES FOR AEM STUDIES
J. A. Desport Apr. 1984 37 p refs
(AERE-R-11266) Copyright. Avail: Issuing Activity

Procedures are described for the preparation of transverse sections of oxide scales formed on metals and alloys for subsequent transmission electron microscopic examination. Equipment was designed and assembled specifically to mechanically prepare flat and parallel sections of thin fragile oxide scales to less than 10 micron thickness. Improvements were made to commercial equipment for the ion beam thinning of the scales to electron transparency. Methods and equipment were designed additionally for safe specimen handling and storage. Author

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N86-24834# California Dept. of Transportation, Sacramento. Office of Transportation Lab.
LOW-SOLVENT PRIMER AND FINISH COATS FOR USE ON STEEL STRUCTURES Final Report
R. Warness Jan. 1985 90 p Sponsored in part by the Federal Highway Administration, Sacramento, Calif.
(PB86-139326; FHWA/CA/TL-85/02) Avail: NTIS HC A05/MF A01 CSCL 11C

Low solvent coatings designed for application of protection of steel in bridges and other structures of structural steel were evaluated. Coatings determined to provide the best performance from laboratory studies were water-borne primers based on a styrene acrylic emulsion and water-borne finish coats based on a 100% acrylic emulsion. GRA

N86-24835*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A PRELIMINARY STUDY OF ESTER OXIDATION ON AN ALUMINUM SURFACE USING CHEMILUMINESCENCE
William R. Jones, Jr., Michael A. Meador, and Wilfredo Morales 1986 32 p refs Presented at the Annual Meeting of the American Society of Lubrication Engineers, Toronto, Ontario, 12-15 May 1986
(NASA-TM-87242; E-2647; NAS 1.15:87242) Avail: NTIS HC A03/MF A01 CSCL 11C

The oxidation characteristics of a pure ester (trimethyolpropane triheptanoate) were studied by using a chemiluminescence technique. Tests were run in a thin-film micro-oxidation apparatus with an aluminum alloy catalyst. Conditions included a pure oxygen atmosphere and a temperature range of 176 to 206 C. Results indicated that oxidation of the ester (containing 10 to the minus 3 power M diphenylanthracene as an intensifier) was accompanied by emission of light. The maximum intensity of light emission (I sub max) was a function of the amount of ester, the concentration of intensifier, and the test temperature. The induction period or the time to reach one-half of maximum intensity (t sub 1/2) was an inverse function of test temperature. Decreases in light emission at the later stages of a test were caused by depletion of the intensifier. Author

N86-24836*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
IMPROVED CONSOLIDATION OF SILICON CARBIDE
Marc R. Freedman and Michael L. Millard (General electric co., Evendale ,Ohio) 1986 14 p refs Presented at the 10th Annual Conference on Composites and Advanced Ceramic Materials, Cocoa Beach, Fla., 19-22 Jan. 1986; sponsored by American Ceramic Society
(NASA-TM-87243; E-2921; NAS 1.15:87243) Avail: NTIS HC A02/MF A01 CSCL 11C

Alpha silicon carbide powder was consolidated by both dry and wet methods. Dry pressing in a double acting steel die yielded sintered test bars with an average flexural strength of 235.6 MPa with a critical flaw size of approximately 100 micro m. An aqueous slurry pressing technique produced sintered test bars with an average flexural strength of 440.8 MPa with a critical flaw size of approximately 25 micro m. Image analysis revealed a reduction in both pore area and pore size distribution in the slurry pressed sintered test bars. The improvements in the slurry pressed material properties are discussed in terms of reduced agglomeration and improved particle packing during consolidation. Author

N86-24837*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ADEQUACY OF SURFACE ANALYTICAL TOOLS FOR STUDYING THE TRIBOLOGY OF CERAMICS
Harold E. Sliney Apr. 1986 21 p refs
(NASA-TM-87308; E-2756; NAS 1.15:87308) Avail: NTIS HC A02/MF A01 CSCL 11C

Surface analytical tools are very beneficial in tribological studies of ceramics. Traditional methods of optical microscopy, XRD, XRF, and SEM should be combined with newer surface sensitive techniques especially AES and XPS. ISS and SIMS can also be useful in providing additional compositon details. Tunneling microscopy and electron energy loss spectroscopy are less known techniques that may also prove useful. Author

N86-24838*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ABRASION AND DEFORMED LAYER FORMATION OF MANGANESE-ZINC FERRITE IN SLIDING CONTACT WITH LAPPING TAPES
Kazuhisa Miyoshi, Donald H. Buckley, and Kyuichiro Tanaka (Kanazawa Univ. Japan) 1986 27 p refs Presented at the ASME/ASLE Tribology Conference, Pittsburgh, Pa., 19-22 Oct. 1986
(NASA-TM-87249; E-2891; NAS 1.15:87249) Avail: NTIS HC A03/MF A01 CSCL 11C

Wear experiments were conducted using replication electron microscopy and reflection electron diffraction to study abrasion and the deformed layers produced in single-crystal Mn-Zn ferrite simulated heads during contact with lapping tapes. The crystaline

state of the head is changed drastically during the abrasion process. Crystalline states ranging from nearly amorphous to highly textured polycrystalline can be produced on the wear surface of a single-crystal Mn-Zn ferrite head. The total thickness of the deformed layer was approximately 0.8 microns. This thickness increased as the load and abrasive grit size increased. The anisotropic wear of the ferrite was found to be inversely proportional to the hardness of the wear surface. The wear was lower in the order 211> 111> 10 0>110. The wear of the ferrite increased markedly with an increase in sliding velocity and abrasive grit size. Author

N86-24839*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PARTICLE SIZE REDUCTION OF SI3N4 WITH SI3N4 MILLING HARDWARE
Thomas P. Herbell, Marc R. Freedman, and James D. Kiser 1986 19 p refs Presented at the 10th Annual Conference on Composites and Advanced Ceramic Materials, Cocoa Beach, Fla., 19-24 Jan. 1986; sponsored by the American Ceramic Society
(NASA-TM-86864-Rev; E-2328-1; NAS 1.15:86864-Rev) Avail: NTIS HC A02/MF A01 CSCL 11C

The grinding of Si3N4 powder using reaction bonded Si3N4 attrition, vibratory, and ball mills with Si3N4 media was examined. The rate of particle size reduction and the change in the chemical composition of the powder were determined in order to compare the grinding efficiency and the increase in impurity content resulting from mill and media wear for each technique. Attrition and vibratory milling exhibited rates of specific surface area increase that were approximately eight times that observed in ball milling. Vibratory milling introduced the greatest impurity pickup. Author

N86-24840*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PROCESS FOR CROSSLINKING METHYLENE-CONTAINING AROMATIC POLYMERS WITH IONIZING RADIATION Patent Application
Vernon L. Bell, inventor (to NASA) and Stephen J. Havens, inventor (to NASA) (Kentron International, Inc., Hampton, Va) Filed 11 Mar. 1986 29 p
(NASA-Case-LAR-13448-1; NAS 1.71:LAR-13448-1; US-Patent-Appl-SN-838654) Avail: NTIS HC A03/MF A01 CSCL 11B

A process for crosslinking aromatic polymers containing radiation-sensitive methylene groups (-CH2-) by exposing the polymers to ionizing radiation thereby causing crosslinking of the polymers through the methylene groups is described. Crosslinked polymers are resistant to most organic solvents such as acetone, alcohols, hydrocarbons, methylene, chloride, chloroform, and other halogenated hydrocarbons,to common fuels and to hydraulic fluids in contrast to readily soluble uncrosslinked polymers. In addition, the degree of crosslinking of the polymers depends upon the percentage of the connecting groups which are methylene which ranges from 5 to 50% and preferably from 25 to 50% of the connecting groups, and is also controlled by the level of irradiation which ranges from 25 to 1000 Mrads and preferably from 25 to 250 Mrads. The temperature of the reaction conditions ranges from 25 to 200C and preferably at or slightly above the glass transition temperature of the polymer. The crosslinked polymers are generally more resistant to degradation at elevated temperatures such as greater than 150C, have a reduced tendency to creep under load, and show no significant embrittlement of parts fabricated from the polymers. Author

N86-24841*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
POLY(CARBONATE-MIDE) POLYMER Patent Application
Terry L. St.Clair, inventor (to NASA), Shubha Maudgal, inventor (to NASA), and J. Richard Pratt, inventor (to NASA) (Mississippi Univ. For Women., Columbus) Filed 27 Feb. 1986 25 p
(NASA-Case-LAR-13292-1; NAS 1.71:LAR-13292-1; US-Patent-Appl-SN-834978) Avail: NTIS HC A02/MF A01 CSCL 11B

A novel series of polymers and copolymers based on a polymide backbone with the incorporation of carbonate moieties along the backbone is presented. The preparation process for the polymers and copolymers is disclosed together with a novel series of dinitrodiphenyl carbonates and diaminodiphenyl carbonates. The novel polymers and copolymers exhibit high temperature capability and because of the carbonate unit, many exhibit a high degree of order and/or crystallinity. NASA

N86-24842# National Aeronautics and Space Administration, Washington, D.C.
MANUFACTURE OF CERAMIC SINTERS
G. Ando and Y. Katano Mar. 1986 26 p refs Transl. into ENGLISH from Japanese patent no. 60-11276 (Appl. 58-115949, 29 Jun. 1983) 13 p Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-4005)
(NASA-TM-88398; NAS 1.15:88398) Avail: NTIS HC A03/MF A01 CSCL 11B

A ceramic body made by injection molding is assembled with another ceramic body made by hydrostatic pressing, but having similar deresination, and sintered to give a ceramic sinter. The process is suitable for the manufacture of ceramic sinters having a complex shape. Thus, a mixture of SiC powder 96, B 0.1, and phenolic resin 4 parts was spray-dried mixed with polystyrene 8, polyethylene 5, ester wax 3.6, di-Bu phthalate 5, and fatty acid ester 1.5 parts, pelletized, injection molded, and heated in N gas at 900 deg C for 2h to prepare a blade part for a turbine rotor. The axle part was made from the mixture containing SiC powder 96, B 0.1, and phenolic resin 4 parts by adding 35 volume % organic binder, hydrostatic press molding, and heated in N gas at 900 deg for 2 hours. The axle was inserted into the blade, hydrostatically pressed at 2 ton/sq cm, and sintered at 2100 degrees for 2 hours to give a crack free rotor. Author

N86-24843# National Aeronautics and Space Administration, Washington, D.C.
INTERPARTICLE INTERFERENCE DURING LIGHT SCATTERING BY SUBMICROINHOMOGENEOUS GLASS
N. S. Andreyev and T. I. Yershova Apr. 1986 10 p refs Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-4004)
(NASA-TM-88407; NAS 1.15:88407) Avail: NTIS HC A02/MF A01 CSCL 11B

Anomalies observed in Na silicate and Na borosilicate glasses were studied. A comparison was made of the index value rho and turbidity tau with structure data obtained by the method of scattering X-rays at small angles. The investigated glasses were held in a gradient furnace and quenched in air. Author

N86-24844# National Aeronautics and Space Administration, Washington, D.C.
BINDERS FOR COMPACTING NITRIDE TYPE CERAMICS
Katsutoshi Maeda Apr. 1986 8 p Transl. into ENGLISH from Japanese Patent no. 60-5064 (Appl. no. 58-110366, 20 Jun. 1983) Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-4004)
(NASA-TM-88397; NAS 1.15:88397) Avail: NTIS HC A02/MF A01 CSCL 11B

The binders contain substance(s) selected from ammonium salt type surfactants, silane coupling agents containing amino or imino groups, and amino-modified polyolefins. Sintered nitride-type ceramics obtained by injection molding materials containing the binders have decreased voids and no cracks. Thus, a mixture composed of dry-milled Si nitride, diallylammonium-styrene copolymer, polystyrene, dioctyl phthalate and other additives was kneaded and injection molded to form a green compact disk. The kneaded material showed no dilatancy. The disk was degreased to show no crack formation, and alternately heated and rapidly cooled 5 times to show no crack formation. Author

N86-24845*# TRW, Inc., Redondo Beach, Calif. Energy Div.
IMPROVED PISTON RING MATERIALS FOR 650 DEG C SERVICE Final Report

W. D. Bjorndahl Mar. 1986 115 p refs
(Contract DE-AI01-80CS-50194)
(NASA-CR-175058; DOE/NASA-0307/1; NAS 1.26:175058; Rept-40933-6021-UT-00) Avail: NTIS HC A06/MF A01 CSCL 11B

A program to develop piston ring material systems which will operate at 650C was performed. In this program, two candidate high temperature piston ring substrate materials, Carpenter 709-2 and 440B, were hot formed into the piston ring shape and subsequently evaluated. In a parallel development effort ceramic and metallic piston ring coating materials were applied to cast iron rings by various processing techniques and then subjected to thermal shock and wear evaluation. Finally, promising candidate coatings were applied to the most thermally stable hot formed substrate. The results of evaluation tests of the hot formed substrate show that Carpenter 709-2 has greater thermal stability than 440B. Of the candidate coatings, plasma transferred arc (PTA) applied tungsten carbide and molybdenum based systems exhibit the greatest resistance to thermal shock. For the ceramic based systems, thermal shock resistance was improved by bond coat grading. Wear testing was conducted to 650C (1202F). For ceramic systems, the alumina/titania/zirconia/yttria composition showed highest wear resistance. For the PTA applied systems, the tungsten carbide based system showed highest wear resistance. Author

N86-24846# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
JOINING OF CERAMICS FOR ADVANCED HEAVY-DUTY DIESELS
A. J. Moorhead and H. Keating Mar. 1986 63 p refs Sponsored by NASA
(Contract DE-AC05-84OR-21400)
(NASA-CR-175019; DOE/NASA/4148-1; NAS 1.26:175019; ORNL-6262) Avail: NTIS HC A04/MF A01 CSCL 11C

The wettability and adherence in vacuum of a series of metal alloys on several oxide ceramics were investigated with the goal of identifying those compositions suitable as filler metals for direct brazing of ceramics in uncooled diesel engine applications. Wetting behavior was determined by the sessile-drop technique. Adherence was measured by several tests including sessile-drop shear, flexure strength of ceramics brazed in a butt-joint configuration, fracture toughness using a composite double cantilever beam specimen, and in the case of ceramic-metal brazements, by a bar/pad shear test. Compositions were identified in both the Cu-Ag-Ti and Cu-Au-Ti ternary systems that wet and strongly adhered to high-purity aluminas, partially stabilized zirconia ceramics, and alumina reinforced with SiC whiskers. Excellent flexural strengths, at temperatures up to 600 C of brazements containing these filler materials indicate that these materials are good candidates for use in advanced heavy-duty diesel engines. Author

N86-24847# Southwest Research Inst., San Antonio, Tex.
EVALUATION OF ARMY ENGINE OILS IN HYDRAULIC/POWER TRANSMISSION SYSTEM COMPONENTS Final Report, Aug. 1984 - Nov. 1985
H. W. Marbach, Jr. and S. J. Lestz Nov. 1985 38 p refs
(Contract DAAK70-84-C-0071)
(AD-A163527; BFLRF-203) Avail: NTIS HC A03/MF A01 CSCL 11/8

The objective of the MACI Hydraulic System and Components Program is to perform technical evaluation and assessment of commerically available qualified and fielded Army engine oils and to determine if such oils can be used as hydraulic fluids in Army commercial construction equipment and material handling equipment. Five Army specification engine lubricants--four MIL-L-2104D (one grade 10W, one grade 30, two grade 15W-40) and one MIL-L-46167, grade 0W-20--were evaluated using four critical component performance tests used by manufacturers. Data compiled from this and previous work have shown that the limiting factors of the Army engine oils used as hydraulic and multipurpose power transmission fluids appear to be (1) wet-brake chatter noise, (2) hydraulic pump wear problems with some piston pumps using MIL-L-46167 Arctic engine oils at temperatures hotter than expected Arctic conditions, and possibly (3) copper corrosion. The prime area of concern is the wet-brake chatter noise. Author (GRA)

N86-24848# Pennsylvania State Univ., University Park. Dept. of Chemistry.
SYNTHESIS OF ALKYL AND ARYL PHOSPHAZENE HIGH POLYMERS Final Report, Aug. 1981 - May 1984
Harry R. Allcock 29 Jan. 1986 4 p refs
(Contract N00014-75-C-0685)
(AD-A163543) Avail: NTIS HC A02/MF A01 CSCL 07/3

New synthetic methods are developed that would allow the synthesis of new polymers with inorganic elements in the backbone. Specifically, organometallic chemistry is used to prepare poly (organophosphazenes) that bear alkyl-or aryl-units as side groups attached to the polyphosphazene chain. This chemistry was carried out at two levels. First, the new reactions were developed at the small-molecule cyclotriphosphazene level to yield cyclic trimers that were subjected to ring-opening polymerization to yield linear high polymers. Second, the same organometallic reactions were conducted with high polymeric phosphazenes to give the alkyl-or arylphosphazene high polymers directly. GRA

N86-24849# Rensselaer Polytechnic Inst., Troy, N.Y.
LUBRICANT FOAMING AND AERATION STUDY, PART 2 Final Report, 1 Mar. 1984 - 1 Jul. 1985
Sydney Ross Dec. 1985 128 p refs
(Contract F33615-80-C-2017)
(AD-A163696; AFWAL-TR-84-2001-Pt-2) Avail: NTIS HC A07/MF A01 CSCL 11/8

This investigation is directed toward obtaining a fundamental understanding of lubricant foaming and aeration. On the practical side, foam tests showed that the surface activity of additives varies from one production batch to another, requiring continuing testing before acceptance. On the fundamental side, three independent techniques were developed to measure dynamic (nonequilibrium) surface tensions of oils containing additives, to obtain simpler correlative physical properties of oil surfaces than the complex multivariant effects that underlie the phenomena of foaming and aeration. These techniques to detect and measure dynamic surface tensions are: measuring changes of surface tension on cycling area contractions and expansions; measuring the damping of capillary ripples; and measuring the rate of ascent of a single bubble in an oil solution. These techniques are able to disclose the presence of surface activity in oil solutions, even before it develops to the state of an overt foam problem. GRA

N86-24850# Ohio State Univ., Columbus.
HOT GAS CORROSION OF SILICON BASED CERAMICS Final Report, 1 Jun. 1982 - 30 Sep. 1985
Eric R. Kreidler and Dennis W. Readey 13 Dec. 1985 88 p refs
(Contract DAAG29-82-K-0149)
(AD-A163810; ARO-18141.2-MS) Avail: NTIS HC A05/MF A01 CSCL 11/2

The hot gas corrosion of Silicon carbide (SiC) and Silica (SiO2) has been studied in a preliminary way, using two instruments constructed at the Ohio State University for this purpose. The two ceramics are not corroded by atmospheres containing 10% HCl in argon at temperatures up to 1150 C. However noticeable attack occurs in hydrogen at 1300 C when the water vapor pressure is below -5 atm. Most of the work on the project has concentrated on the construction and debugging of a high temperature, high pressure mass spectrometer sampling device to be used for quantitative studies of the chemistry and thermodynamics of corrosion reactions. A high temperature thermogravimetric system has also been constructed to study the kinetics of the hot gas corrosion reactions. Theoretical calculations of the chemical equilibria, to be expected in a number of corrosion reactions, have been carried out and are discussed. GRA

N86-24851# Aerospace Corp., El Segundo, Calif.
ADHESION AND THE SURFACE BEHAVIOR OF THE SILICONE ELASTOMER
R. S. Bretzlaff, T. A. Freitab, and A. Y. Lee 1 Nov. 1985 51 p refs
(Contract F04701-85-C-086)
(AD-A163815; TR-0086(6935-03)-1; SD-TR-85-79) Avail: NTIS HC A04/MF A01 CSCL 11/10

The silicon elastomer RTV-142 is often used as a particle-getter material inside electronics packages. The adhesion mechanism that forms the bond between the particle and the cured adhesive has been investgigated. One expects, theoretically, that polymer chains exhibit a temperature-dependent mobility. This is consistent with the hypothesis that flow of polymer chain segments around asperities on the foreign particles causes adhesion. Calculations of the surface energy of an idealized polymer system are presented which support the concept of an entropically driven flow of chain segments into pores and around asperities. Polymer surface-chain mobility is investigated experimentally by the scanning electron microscope analysis of a fractured, cut, and particle-decorated surface. Surface appearance changes were noted as a function of temperature. Scanning electron micrographs indicate that polymer chain movement is temperature dependent. Such findings support the proposed adhesion mechanism. GRA

N86-24852# Brookhaven National Lab., Upton, N. Y.
PHYSICO-CHEMICAL FACTORS AFFECTING HYDROTHERMAL RESISTANCE AND BONDING OF POLYMERIC COMPOSITES TO STEEL SURFACES Final Report, Aug. 1982 - Jul. 1985
T. Sugama, L. E. Kukacka, N. R. Carciello, and J. B. Warren Nov. 1985 165 p refs
(Contracts DE-AC02-76CH-00016; MIPR-ARO-62-82)
(AD-A163906; BNL-37376; ARO-19708.7-MS) Avail: NTIS HC A08/MF A01 CSCL 11/3

The failure upon exposure to hydrothermal conditions of most conventional polymers containing functional groups in which any two atoms selected from N, O, and S are joined to the same carbon atom, is generally due to: (1) high segmental mobility of molecular chains, (2) low thermal relaxation of the polymers, (3) an increase in hydrophilic groups, and (4) low dynamic mechanical properties. Each of these factors must be considered in attempting to provide the total protection needed for long service life in hydrothermal environments. Therefore, the physico-chemical factors that determine the hydrothermal stability and the bonding characteristics of inorganic macromolecule-ionomer composite films have been investigated. GRA

N86-24853 Department of the Air Force, Washington, D.C.
METHOD FOR MAKING HETEROCYCLIC BLOCK COPOLYMER Patent
Tsu-Tsu Tsai, inventor (to Air Force) and Fred E. Arnold, inventor (to Air Force) Issued 1 Oct. 1985 4 p
(AD-D011971; US-Patent-4,544,713; US-Patent-Appl-SN-610912; US-Patent Class-525-432) Avail: US Patent and Trademark Office CSCL 07/3

Described are thermally stable automatic heterocyclic block copolymers as prepared by reacting a diaminc monomer and terephthalic acid to form a carboxy-terminated rigid rod segment and then polymerizing a carbonxy-monoamine monomer to form flexible segments grafted onto the rigid rod segments. GRA

N86-24854 Department of the Air Force, Washington, D.C.
PROTECTED ETHYNLATED PHENOLS Patent
J. S. Wallace, inventor (to Air Force) and Fred E. Arnold, inventor (to Air Force) Issued 10 Sep. 1985 6 p
(AD-D012019; US-Patent-4,540,833; US-Patent-Appl-SN-592033; US-Patent Class-568-766) Avail: US Patent and Trademark Office CSCL 07/3

Alpha-hydroxy-, alpha-alkyl;-substituted acetylene compounds are discussed. A new method for adding terminal acetylene groups to a molecule is provided. A novel acetylenic end-capping agent for oligomers is also described. A method for preparing novel acetylenic end-capping agents is discussed. A method is also provided for adding terminal acetylene groups to a molecule which comprises reacting a halogen-terminated molecule with the above-described end-capping agent followed by base-catalyzed cleavage. GRA

N86-24855# Pennsylvania State Univ., University Park. Dept. of Ceramic Science and Engineering.
TAILORING MULTIPHASE CERAMICS Final Report, 1 Jun. - 30 Sep. 1985
Richard E. Tressler and Robert E. Newnham 9 Dec. 1985 21 p refs
(Grant AF-AFOSR-ISSA-85-00093)
(AD-A164010; AFOSR-86-0003TR) Avail: NTIS HC A02/MF A01 CSCL 11/2

The Tailoring Multiphase Ceramics Conference emphasized the discussion and analysis of the properties of multiphase ceramic materials in which the microstructure is deliberately tailored for specific applications or properties. A number of internationally recognized authorities presented keynote and invited lectures on topics dealing with processing and fabrication of multiphase and composite ceramics, multiphase electroceramics, fiber and whisker reinforced composites, and high temperature multiphase ceramics. The results of recent research were presented in oral and poster sessions by leading researchers from several countries. Author (GRA)

N86-24856# Illinois Univ., Urbana. Dept. of Metallurgy and Mining Engineering.
CRACK HEALING IN POLYMERS Final Report, 18 Apr. 1983 - 30 Sep. 1985
R. P. Wool 20 Dec. 1985 17 p refs
(Contract DAAG29-83-K-0073)
(AD-A164130; ARO-19990.6-MS) Avail: NTIS HC A02/MF A01 CSCL 11/9

When two similar polymers contact in the melt to form a polymer-polymer interface, interdiffusion of random-coil chains occurs. For this case, we determine a set of properties, H, as a function of time, t, and molecular weight, M. They include the number of chains, n, number of bridges, p, average monomer interpenetration depth, X, the total monomer depth, X sub o, the center of mass diffusion, X sub cm, the average contour interpenetration length, I, the total contour length, L sub O, and the average bridge length, l sub p. The time dependent, H(t), and equilibrium solutions, H infinity, are summarized. When two similar amorphous polymers make good contact to form a polymer-polymer interface, we ask how strength develops as a function of contact time, t, and molecular weight, M, of the polymers. Fracture stress, sigma, shear stress tau, critical fracture energy, G sub IC, and fatigue crack propagation rates, da/dN, are determined as functions of t and M. Solutions to this problem have application to polymer processing, internal weld-lines, coatings, welding, lamination and the physics of fracture mechanics. The problem is divided into three parts. The first part consists of determining a set of molecular properties for the interface, H(t). The second part relates the properties of the interface to the mechanical properties via a set of deformation mechanisms involving chain disentanglement and bond rupture. The third part of the solution consists of determining the fracture. GRA

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N86-24857# Ballistic Research Labs., Aberdeen Proving Ground, Md.
RADICAL FLUORESCENCE STUDIES WITH LIQUID PROPELLANTS Final Report

Richard A. Beyer Dec. 1985 21 p refs
(AD-A163472; BRL-MR-3488) Avail: NTIS HC A02/MF A01 CSCL 19/1

In the development of liquid propellants for regenerative guns, the physical location of ignition and combustion of a jet or spray of propellant as it enters the combustion chamber can provide insight into the rate of energy release in these systems. Radical fluorescence emission has been characterized for the combustion of typical liquid monopropellants composed of hydroxylammonium nitrate, an aliphatic ammonium nitrate, and water. Ignition of the samples was done by injection of a spray into a hydrogen-air diffusion flame. Positive identification was made of the following key radical species: NH, CN, C2, CH, and NO2. Possible signals from NH2 were also observed. The OH radical, already present in the flame, gave diminished emission due to the cooling effect of the LP on these flames at atmospheric pressure. NCO was likely present, but would not have been observed under the conditions of these observations. From the convolution of light intensity and detector response, the radical CN is the clear choice for maximum signal-to-noise ratio. Preliminary two-dimensional imaging of the fluorescence was done to demonstrate the utility of the technique for the study of liquid propellant sprays. Thus, the probability of success for active laser probing of LP spray combustion looks excelle nt, with the prime candidate for probing being the CN molecule. Other candidates such as C2 and NO2 are possible candidates with continuous or high rate metal vapor lasers. GRA

N86-24858# Southwest Research Inst., San Antonio, Tex.
DEVELOPMENT OF A TEST METHOD TO DETERMINE POTENTIAL PEROXIDE CONTENT IN TURBINE FUELS Interim Report, 1 May 1984 - 31 Mar. 1985
G. E. Fodor, D. W. Naegeli, K. B. Kohl, and J. P. Cuellar, Jr. 1 Jun. 1985 41 p refs
(Contracts DAAK70-85-C-0007; DAAK70-82-C-0001)
(AD-A163590; BFLRF-199; NAPC-PE-137C) Avail: NTIS HC A03/MF A01 CSCL 11/7

A test method was developed for the prediction of peroxide potential of fuels, experimental conditions were sought so that the oxidative tendencies of fuels could be assessed within a reasonable time i.e., less than 48 hours. Through the generally accepted 43 C (110 F) bottle storage method fo accelerated fuel aging, the relative ratings of four selected fuels' oxidative tendencies were established. A matrix of experiments was designed to allow selection of those short-term reaction conditions that would give results comparable to the 43 C bottle storage experiments. Additionally, the results of these experiments would allow the development of global reaction kinetics to aid the determination of fuel peroxidation potential. From a partially completed experimental matrix, fuel stressing was completed at 60 and 100 C under an initial oxygen pressure of 689 kPa (100 psig). Experimental results at 60 C gave inconclusive results. Results of the 100 C experiments produced essentially self-consistent results that also agreed with those of the bottle storage for the most stables and least stable fuels. Results of the two intermediate stability fuels, however were interchanged. GRA

N86-24859# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CALCULATED RESEARCH ON THE ENERGETIC CHARACTERISTIC OF TN IN COMPOSITE SOLID PROPELLANT
Wei Zhang and Deyu Tian 6 Jan. 1986 15 p refs Transl. into ENGLISH From Yuhang Xueboa (China), no. 2, 1984 p 84-90 Original language document announced as A84-43361
(AD-A163691; FTD-ID(RS)T-0905-85) Avail: NTIS HC A02/MF A01 CSCL 21/9

This paper discussed briefly the properties of a new organic oxidizer -- 2,3,5,6 -- Tetranitrato- 1,4-Dinitropiperazine (TN). On the basis of the method of White's Minimization of Gibbs Free Energy, we also studied the energetic characteristics of TN in Composite Solid Propellant by means of electronic computer. The calculated results show that the theoretic specific impulse of the system of TN, AL and HTPB reaches 276 seconds, about ten seconds higher than the system of AP, Al and HTPB. This shows that TN does act as a high energetic oxidizer. The paper also did an initial research on the energetic characteristics of composite solid smokeless propellant consisting of TN and HTPB. GRA

N86-24860# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
NON-DESTRUCTIVE LASER HOLOGRAPHIC TESTING OF SOLID PROPELLANT FOR UNBONDING DEFECTS
Yongbao Wang 15 Jan. 1986 17 p refs Transl. into ENGLISH from Wusung Jiance (China), v. 6, no. 1, Feb. 1984 p 4-7
(AD-A163694; FTD-ID(RS)T-0964-85) Avail: NTIS HC A02/MF A01 CSCL 21/8

This paper describes the feasibility and sensitivity of using a laser holographic technique to detect unbonding defects in solid propellant rocket components. Its conclusions are: 1) laser holography can detect the unbonding defects between the propellant, coating, insulating layer and shell. X-ray could not detect such defects in similar specimens; 2) the sensitivity of detection depends on the H/d ratio. The ratio is around 2.9 for the propellant. When the H/d ratio is equal to or less than this value, even 1 mm diameter unbonding defects can be detected; 3) the value of H/d is related to the nature of the material (modulus of elasticity). The H/d value of the coat is around 0.7. 4. The sensitivity of detection also depends on the gas content at the defect. The sensitivity of detecting an unseparated defect is decreased by more than one half of that of detecting a separated defect. GRA

N86-24861# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ACTA ARMAMENTARII (SELECTED ARTICLES)
6 Jan. 1986 25 p refs Transl. into ENGLISH from Binggong Xuebao (China), no. 3, Aug. 1984 p 61-64
(AD-A163713; FTD-ID(RS)T-0913-85) Avail: NTIS HC A02/MF A01 CSCL 21/8

Among the articles in this report are the following: SEM Examination of Molybdenum Nozzle and Investigation of the Erosion Mechanism; Experimental Method to Measure Erosive Burning Speed of Propellant Using High Speed Photography Technique. GRA

N86-24862# Science Applications International Corp., McLean, Va. Military Operations Analysis Div.
FIRE RESISTANT FUEL PROGRAM ANALYSIS AND PROGRAM MANAGEMENT DOCUMENTATION Final Report, Dec. 1985 - Jan. 1986
C. A. Dye 31 Jan. 1986 49 p refs
(Contract DAAK70-84-D-0053)
(AD-A163724; SAIC-86/1024) Avail: NTIS HC A03/MF A01 CSCL 21/4

There was an urgent need to transfer management of the Fire Resistant Fuel (FRF) Program from the Materials Fuels and Lubricants Laboratory (MFLL) to the Logistics Support Directorate (LSD). It is recommended that the LSD develop program management documentation (PMD) that support a Milestone 1 review as soon as possible to include the following: System Concept Paper, Concept Formulation Package and a Test Evaluation Master Plan. This report describes programmatic analyses and subsequent programmatic recommendations. GRA

N86-24863# Chemical Research and Development Center, Aberdeen Proving Ground, Md.
A DIMENSIONAL ANALYSIS APPROACH FOR CHARACTERIZING PRYOTECHNIC MIXTURE SYSTEMS Technical Report, Mar. - Apr. 1984
Khong Q. Truong and Cecil D. Hassell Dec. 1985 19 p
(DA Proj. 1L1-62622-A-554)
(AD-A163018; CRDC-TR-84131) Avail: NTIS HC A02/MF A01 CSCL 19/1

The objective of this work was to correlate pyrotechnic mixture dissemination/characterization variables such as activation energy, heat capacity, packing density, and burning rate by using the technique of dimensional analysis. Dimensional groupings have

been generated and will be verified eventually by actual experimental data from variant pyrotechnic mixture systems. GRA

N86-24864# Naval Postgraduate School, Monterey, Calif.
HOLOGRAPHIC INVESTIGATION OF SOLID PROPELLANT COMBUSTION IN A THREE-DIMENSIONAL MOTOR M.S. Thesis
Sang Chu Yoon Dec. 1985 39 p refs
(AD-A164217) Avail: NTIS HC A03/MF A01 CSCL 21/8

An investigation was conducted to determine the feasibility of obtaining holographic recordings of particulate behavior during the combustion process of solid propellant in a three-dimensional, windowed rocket motor. Transmittance measurements through the combustion chamber were made in order to select the appropriate neutral density filters which would yield the proper scene beam to reference beam intensity ratio. Holographic recordings were successfully made at combustion chamber pressures up to 185 psia using an HTPB-AP propellant containing 2.0% aluminum and 0.25% Fe203. The laser had to be fired manually because of the unreliability of the current igniter/grain design. For high combustion pressures, it is recommended that the laser beam power density be increased to penetrate the more opaque combustion products. Also, it is strongly recommended that a remote controlled laser firing device be used to improve the timing sequence for the hologram. GRA

N86-24865# Environmental Protection Agency, Research Triangle Park, N.C. Atmospheric Sciences Research Lab.
EMISSIONS FROM A LIGHT-DUTY DIESEL: AMBIENT TEMPERATURE AND FUEL EFFECTS
P. Gabele, W. Karches, W. Ray, and N. Perry NOAA Oct. 1985 32 p refs Prepared in cooperation with Northrop Services, Inc., Research Triangle Park, N.C.
(PB86-131349; EPA-600/D-85/272) Avail: NTIS HC A03/MF A01 CSCL 21D

Exhaust emissions from a diesel passenger car were characterized and measured to examine the effect of ambient temperature on emissions performance. The vehicle was tested at three temperatures on a chassis dynamometer located within a cold cell. Three driving cycles and three fuels of varying quality were used. The effort include measurements of regulated exhaust gases and particles, particulate organic fractions and their molecular-weight distributions, particulate fractions under 2 microns in diameter, trace metal contents, and fuel economy. Results indicate that reductions in ambient temperature had little effect on emissions or fuel economy in the study. In some cases, statistically significant increases in NOx emissions were measured with decreases in ambient test temperature. Other differences related to temperature effect occured more frequently with the lower quality fuels.
Author (GRA)

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N86-24866# National Bureau of Standards, Gaithersburg, Md. National Engineering Lab.
HEAT TRANSFER IN COMPARTMENT FIRES NEAR REGIONS OF CEILING JET-WALL IMPINGEMENT
Leonard Y. Cooper 1985 5 p refs Presented at the Fall Technical Meeting Eastern Section of the Combustion Inst., Philadelphia, Pa., 4-6 Nov. 1985
Avail: NTIS HC A02/MF A01

As a fire grows in an enclosure, the elevated temperature air and products of combustion which leave the zone of the burning object form a fire plume and are convected upward by buoyancy. When the upward movement of the plume constituents are blocked by the ceiling they spread radially outward forming a relatively thin turbulent ceiling jet. Depending on the proximity of vertical surfaces, this ceiling jet either loses most of its moment far out on its trajectory or can be expected to interact vigorously with these bounding surfaces by forming a downward wall jet flow which is eventually turned back upward by its own buoyancy. Once the ceiling jet gases are blocked by bounding vertical surfaces, they begin to redistribute themselves across the entire ceiling area of the enclosure. Eventually a relatively quiescent, stably stratified, upper gaslayer is formed below the ceiling jet activity. An experimental program to study the wall flow is underway. To use the results of this program on wall flows requires an understanding of the ceiling jet turning region near ceiling jet-wall impingement. It is the objective of the present work to begin to develop such an understanding. As a fire grows in an enclosure, the elevated temperature air and products of combustion which study the wall flows is underway. To use the results of this program and anticipated future results on wall flows requires an understanding, not now available, of the ceiling jet turning region near ceiling jet-wall impingement. It is the objective of the present work to begin to develop such an understanding. B.W.

N86-24867*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DEPLOYABLE GEODESIC TRUSS STRUCTURE A01 Patent Application
Martin M. Mikulas, Jr., inventor (to NASA), Marvin D. Rhodes, inventor (to NASA), and J. Wayne Simonton, inventor (to NASA) Filed 20 Feb. 1986 15 p
(NASA-Case-LAR-13113-1; NAS 1.71:LAR-13113-1; US-Patent-Appl-SN-831371) Avail: NTIS HC A02/MF A01 CSCL 13B

A deployable geodesic truss structure which can be deployed from a stowed state to an erected state is described. The truss structure includes a series of bays, each bay having sets of battens connected by longitudinal cross members which give the bay its axial and torsional stiffness. The cross members are hinged at their mid point by a joint so that the cross members are foldable for deployment or collapsing. The bays are deployed and stabilized by actuator means connected between the mid point joints of the cross members. Hinged longerons may be provided to also connect the sets of battens and to collapse for stowing with the rest of the truss structure. The truss structure has the capability of serving a structural function even when only partly deployed. NASA

N86-24868# National Aeronautics and Space Administration, Washington, D.C.
THE LONG-RANGE SHELLING OF PARIS AND PHYSICAL CHEMISTRY PROBLEMS OF EXTREMELY LONG-RANGE FIRING
A. Stettbacher Apr. 1986 22 p refs Transl. into ENGLISH from Zeitschrift fuer das Gesamte Schiess- und Sprengstoffwesen (Munich, West Germany), v. 14, no. 16, Aug. 1919 p 265-267 Presented at the Physics Society, Zurich, Switzerland, 8 May 1919 Transl. by The Corporate Word, Inc., Pittsburgh, Pa.
(Contract NASw-4006)
(NASA-TM-88416; NAS 1.15:88416) Avail: NTIS HC A02/MF A01 CSCL 13B

The 128-km long-range artillery shelling of Paris is discussed considering its physical and chemical make-up from the vantage point of the technology in 1919. It compares this shelling with a hypothetical 240-km shelling and concludes that the most important influence on shelling range distance to be air resistance. The amount of air resistance and the resulting velocity deceleration depend on the air's density and the shell's velocity and configuration. Auhtor

N86-24869*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CRITERIA FOR SIGNIFICANCE OF SIMULTANEOUS PRESENCE OF BOTH CONDENSIBLE VAPORS AND AEROSOL PARTICLES ON MASS TRANSFER (DEPOSITION) RATES
Sueleyman A. Goekoglu (Case Western Res. Univ., Cleveland Ohio) Feb. 1986 17 p refs
(NASA-TM-87247; E-2929; NAS 1.15:87247) Avail: NTIS HC A02/MF A01

The simultaneous presence of aerosol particles and condensible vapors in a saturated boundary layer which may affect deposition rates to subcooled surfaces because of vapor-particle interactions is discussed. Scavenging of condensible vapors by aerosol particles may lead to increased particle size and decreased vapor mass fraction, which alters both vapor and particle deposition rates. Particles, if sufficiently concentrated, may also coagulate. Criteria are provided to assess the significance of such phenomena when particles are already present in the mainstream and are not created inside the boundary layer via homogeneous nucleation. It is determined that there is direct proportionality with: (1) the mass concentration of both condensible vapors and aerosol particles; and (2) the square of the boundary layer thickness to particle diameter ratio (delta d sub p) square. Inverse proportionality was found for mainstream to surface temperature difference if thermophoresis dominates particle transport. It is concluded that the square of the boundary layer thickness to particle diameter ratio is the most critical factor to consider in deciding when to neglect vapor-particle interactions. Author

N86-24870# California Univ., Davis.
IMPROVED NUMERICAL IMPLEMENTATION OF THE BOUNDING SURFACE PLASTICITY MODEL FOR COHESIVE SOILS Final Report, Jan. - Sep. 1985
Leonard R. Herrmann, Victor Kaliakin, and C. K. Shen Dec. 1985 61 p refs
(Contract N62583-85-M-T176)
(AD-A163572; NCEL-CR-86.004) Avail: NTIS HC A04/MF A01 CSCL 08/13

A substantially more robust numerical algorithm for the evaluation of the bounding surface plasticity model for cohesive soils is developed. The robustness of the new algorithm assures accurate results for reasonably sized solution steps and qualitatively correct predictions, even for exceptionally large steps. The improved predictions are illustrated for three examples. GRA

N86-24871# Purdue Univ., West Lafayette, Ind. School of Industrial Engineering.
THE SCIENCE OF AND ADVANCED TECHNOLOGY FOR COST-EFFECTIVE MANUFACTURE OF HIGH PRECISION ENGINEERING PRODUCTS. VOLUME 4. THERMAL EFFECTS ON THE ACCURACY OF NUMERICALLY CONTROLLED MACHINE TOOL Final Report, 1 Jan. 1983 - 15 Aug. 1985
Raghunath Venugopal, Moshe M. Barash, and C. R. Liu Oct. 1985 365 p 4 Vol.
(Contract N00014-83-K-0385)
(AD-A163598) Avail: NTIS HC A16/MF A01 CSCL 13/9

Thermal effects on the accuracy of numerically controlled machine tools are specially important in the context of unmanned manufacture or under conditions of precision metal cutting. Removal of the operator from the direct control of the metal cutting process has created problems in terms of maintaining accuracy. The objective of this research is to study thermal effects on the accuracy of numerically controlled machine tools. The initial part of the research report is concerned with the analysis of a hypothetical machine. The thermal characteristics of this machine are studied. Numerical methods for evaluating the errors exhibited by the slides of the machine are proposed and the possibility of predicting thermally induced errors by the use of regression equations is investigated. A method for computing the workspace error is also presented. The final part is concerned with the actual measurement of errors on a modern CNC machining center. Thermal influences on the errors is the main objective of the experimental work. Thermal influences on the errors of machine tools are predictable. Techniques for determining thermal effects on machine tools at a design stage are also presented. GRA

N86-24872# National Bureau of Standards, Gaithersburg, Md. Office of Product Standards Policy.
PROCEEDINGS OF CONFERENCE ON INTERNATIONAL STANDARDS
E. A. Vadelund Aug. 1985 128 p Conference held in Gaithersburg, Md., Aug. 1985
(PB86-130044; NBSIR-83/3228) Avail: NTIS HC A07/MF A01 CSCL 05C

The Overview of the Conference distills the main themes and points of discussion during the meeting. It identifies the strictures set forth in the OMB Circular A-119 which govern and give guidance to Federal agencies functioning in the international standards area either as participants or users. Three areas of concern to Federal agencies are identified as suitable topics for the Interagency Committee on Standards Policy to pursue. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N86-24873 Minnesota Univ., Minneapolis.
WAVE ATTENUATION IN PERIODIC STRUCTURES Ph.D. Thesis
Ajit Kumar Roy 1985 145 p
Avail: Univ. Microfilms Order No. DA8528833

The attenuation of bending waves in a periodic structure is examined. A study of the traveling waves in a uniform beam was made in preparation for the study of the attenuation of the waves in the periodic structure. The traveling bending waves in the beams were induced by a transverse impact. For the uniform beam the force-time impact history was calculated by integrating the dynamic equations of the beam and the impactor. The time history of the bending moment of the traveling waves at any point was then obtained by taking an inverse Fast Fourier Transform (FFT) of the bending moment power spectral density with appropriat2 phase shift which is a function of distance and frequency. The periodic structure was constructed by fastening transverse cantilevers to the uniform beam at regular intervals. Two analytical models for this periodic beam were developed; one was for an infinite array of identical sections and the other was for a finite array of periodic sections in an infinite beam. The stop and pass bands for the infinite model was found by an eigenvalue technique. A dynamic stiffness matrix technique and transfer matrices were used to calculate the attenuation for the finite model. Dissert. Abstr.

N86-24874 British Broadcasting Corp., Kingswood (England). Engineering Div.
COLOUR ENCODING AND DECODING TECHNIQUES FOR LINE-LOCKED SAMPLED PAL AND NTSC TELEVISION SIGNALS
C. K. P. Clarke Mar. 1986 38 p refs
(BBC-RD-1986/2) Copyright. Avail: BBC, Kingswood Warren, Tadworth, Surrey, England

For many years subcarrier-locked sampling was preferred for digital processing of composite video signals. However, the use of line-locked sampling in composite signal coders and decoders is advantageous for compatibility with studio component signals, and for operation with monochrome signals, and for color signals in which the subcarrier to sync. frequency relationship is incorrect. Digital techniques are described for generating, from a line-locked sampling frequency, quadrature subcarrier signals for use in composite color encoders and for locking these signals to the incoming reference burst in color decoders. This allows the advantages of the more stable, better defined performance obtained with digital implementation to extend to coders and decoders without the need for sample rate conversion to digital studio component signals. Although the main description is for the PAL system, modifications necessary for NTSC signals are also included. Author

N86-24875*# Martin Marietta Aerospace, Denver, Colo.
SATELLITE VOICE BROADCAST. VOLUME 1: EXECUTIVE

SUMMARY Final Report, Apr. 1984 - Jun. 1985
E. E. Bachtell, S. S. Bettadapur, J. V. Coyner, and C. E. Farrell Nov. 1985 17 p refs
(Contract NAS3-24233)
(NASA-CR-175016; NAS 1.26:175016) Avail: NTIS HC A02/MF A01 CSCL 17B

An Executive Summary of the Satellite Voice Broadcast System Study designs are synthesized for direct sound broadcast satellite systems for HF-, VHF-, and Ku-bands. Methods are developed and used to predict satellite weight, volume, and RF performance for the various concepts considered. Cost and schedule risk assessments are performed to predict time and cost required to implement selected concepts. Technology assessments and tradeoffs are made to identify critical enabling technologies that require development to bring technical risk to acceptable levels for full scale development. Author

N86-24876*# Martin Marietta Aerospace, Denver, Colo.
SATELLITE VOICE BROADCAST. VOLUME 2: SYSTEM STUDY Final Report, Apr. 1984 - Jun. 1985
Eric E. Bachtell, Shailesh S. Bettadapur, John V. Coyner, and Curtis E. Farrell Nov. 1985 261 p refs 2 Vol.
(Contract NAS3-24233)
(NASA-CR-175017; NAS 1.26:175017; MTR-85-556-Vol-2) Avail: NTIS HC A12/MF A01 CSCL 17B

The Technical Volume of the Satellite Broadcast System Study is presented. Designs are synthesized for direct sound broadcast satellite systems for HF-, VHF-, L-, and Ku-bands. Methods are developed and used to predict satellite weight, volume, and RF performance for the various concepts considered. Cost and schedule risk assessments are performed to predict time and cost required to implement selected concepts. Technology assessments and tradeoffs are made to identify critical enabling technologies that require development to bring technical risk to acceptable levels for full scale development. Author

N86-24877*# TRW Space Technology Labs., Redondo Beach, Calif. Federal Systems Div.
SATELLITE VOICE BROADCAST SYSTEM STUDY, VOLUME 2 Technical Report, 11 Apr. 1984 - 11 Jul. 1985
Michael Horstein Jul. 1985 335 p refs 3 Vol.
(Contract NAS3-24232)
(NASA-CR-174905; NAS 1.26:174905) Avail: NTIS HC A15/MF A01 CSCL 17B

This study investigates the feasibility of providing Voice of America (VOA) broadcasts by satellite relay, rather than via terrestrial relay stations. Satellite voice broadcast systems are described for three different frequency bands: HF (26 MHz), VHF (68 MHz), and L-band (1.5 GHz). The geographical areas of interest at HF and L-band include all major land masses worldwide with the exception of the U.S., Canada, and Australia. Geostationary satellite configurations are considered for both frequency bands. In addition, a system of subsynchronous, circular satellites with an orbit period of 8 hours is developed for the HF band. VHF broadcasts, which are confined to the Soviet Union, are provied by a system of Molniya satellites. Satellites intended for HF or VHF broadcastinbg are extremely large and heavy. Satellite designs presented here are limited in size and weight to the capability of the STS/Centaur launch vehicle combination. Even so, at HF it would take 47 geostationary satellites or 20 satellites in 8-hour orbits to fully satisfy the voice-channel requirements of the broadcast schedule provided by VOA. On the other hand, three Molniya satellites suffice for the geographically restricted schedule at VHF. At L-band, only four geostationary satellites are needed to meet the requirements of the complete broadcast schedule. Moreover, these satellites are comparable in size and weight to current satellites designed for direct broadcast of video program material. Author

N86-24878*# TRW, Inc., Redondo Beach, Calif.
SATELLITE VOICE BROADCASE SYSTEM STUDY. VOLUME 1: EXECUTIVE SUMMARY Contractor Report, 11 Apr. 1984 - 11 Jul. 1985
Michael Horstein Jul. 1985 46 p , 1-45 NOV.
(Contract NAS3-24232)
(NASA-CR-174904; . NAS 1.26:174904) Avail: NTIS HC A03/MF A01 CSCL 17B

The feasibility of providing Voice of America (VOA) broadcasts by satellite relay was investigated. Satellite voice broadcast systems are described for three different frequency bands: HF, FHV, and L-band. Geostationary satellite configurations are considered for both frequency bands. A system of subsynchronous, circular satellites with an orbit period of 8 hours was developed for the HF band. The VHF broadcasts are provided by a system of Molniya satellites. The satellite designs are limited in size and weight to the capability of the STS/Centaur launch vehicle combination. At L-band, only four geostationary satellites are needed to meet the requirements of the complete broadcast schedule. These satellites are comparable in size and weight to current satellites designed for the direct broadcast of video program material. Author

N86-24879*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
METHOD AND APPARATUS FOR MEASURING DISTANCE Patent Application
Christopher L. Lichtenberg, inventor (to NASA), Paul W. Shores, inventor (to NASA), and Herbert S. Kobayashi, inventor (to NASA) Filed 20 Feb. 1986 34 p
(NASA-Case-MSC-20912-1; NAS 1.71:MSC-20912-1;
US-Patent-Appl-SN-831183) Avail: NTIS HC A03/MF A01 CSCL 17I

The invention employs a continuous wave radar technique and apparatus which can be used as a distance measuring system in the presence of background clutter, by utilizing small passive transponders. A first continuous electromagnetic wave signal S sub 1 at a first frequency f sub 1 is transmitted from a first location. A transponder carried by a target object positioned at a second (remote) location receives the transmitted signal, phase-coherently divides the f sub 1 frequency and phase therefore, and re-transmits the transmitted signal as a second continous electromagnet wave signal S sub 2 at a lower second frequency f sub 2 which is a subharmonic of f sub 1. The re-transmitted signal is received at the first location where a measurement of the phase difference is made between the signals S sub 1 and S sub 2, such measurement being indicative of the distance between the first and second locations. In a preferred embodiment, the transponder is a passive divide-by-two parametric oscillator employing the energy from the transmitted signal S sub 1 incident thereon to generate the re-transmitted signal S sub 2. NASA

N86-24880*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MEASUREMENT APPARATION AND PROCEDURE FOR THE DETERMINATION OF SURFACE EMISSIVITIES Patent Application
Hans-Juergen C. Blume, inventor (to NASA) Filed 3 Dec. 1985 27 p
(NASA-Case-LAR-13455-1; NAS 1.71:LAR-13455-1;
US-Patent-Appl-SN-804040) Avail: NTIS HC A03/MF A01 CSCL 20N

A method and apparatus for independently determining the electromagnetic surface emissivity of a material is developed, which is particularly useful in the design of large deployable space antennas employing mesh membrane surfaces. The system is a closed one with respect to unwanted or uncorrelated radiation outside the system. The present embodiment comprises a radiometer connected to a horn antenna, a test section sealed to the horn antenna and a cryogenically cooled matched load (cryoload) exposed to the interior of the system. The material is enclosed in a convection test chamber within the test section, heated by convection within a test chamber and allowed to radiate within the system such that a component of the radiation energy of the material is measured by the radiometer in terms of brightness temperature. A matched load serves as the stabilized source of uncorrelated radiation within the system. The actual physical temperature of the material is also measured during the heating

process with a thermometer. The difference in brightness temperature over a selected period of time when divided by the physical temperature over the same period of time is the emissivity of the material according to a derivation of the Raleigh - Jeans approximation for an ideal system free from all uncorrelated radiation.
Author

N86-24881*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
IMPACT OF THE 1985 SPACE WORLD ADMINISTRATIVE RADIO CONFERENCE ON FREQUENCY/ORBIT PLANNING AND USE
Edward F. Miller 1986 8 p refs Presented at the 11th Annual Communications Satellite Systems Conference, San Diego, Calif., 16-20 Mar. 1986; sponsored by the American Inst. of Aeronautics and Astronautics
(NASA-TM-87285; E-2976; NAS 1.15:87285) Avail: NTIS HC A02/MF A01 CSCL 17B

The 1985 World Administrative Radio Conference (WARC-ORB-85) was held to determine which space radio services should be planned and which planning methods should be used. The second session of this Conference (WARC-ORB-88) will meet to develop the required plans. This paper presents the results of WARC-ORB-85, assesses the impact of those decisions, and identifies the intersessional work to be conducted by administrations and the CCIR (Consultative Committee on International Radio). The major decisions of WARC-ORB-85 were: (1) the restriction of additional planning to the fixed satellite service at identified frequencies; and (2) the selection of a planning method consisting of two parts (a) an allotment plan, and (b) improved procedures. The paper also discusses WARC-ORB-85 decisions relative to the Region 2 broadcast satellite service plans at 12 GHz, feederlink planning for Regions 1 and 3 broadcast satellites at 12 GHz, and sound broadcast satellite service. Author

N86-24882# Ohio State Univ., Columbus. Electroscience Lab.
NCTR USING A POLARIZATION-AGILE COHERENT RADAR SYSTEM Final Report
E. K. Walton, D. L. Moffatt, F. D. Garber, A. Kamis, and C. Y. Lai Jan. 1986 66 p refs
(AD-A163528; ESL-716559-2) Avail: NTIS HC A04/MF A01 CSCL 17/9

This report describes the results of the first year of a research project performed by the Ohio State University ElectroScience Laboratory (OSU/ESL) for the Naval Weapons Center (NWC). The goal of this project is to explore the use of the polarization properties of the signal scattered from a radar target for the purpose of radar target identification. Various radar target identification algorithms were applied to the case of a full polarization coherent radar system, and were tested using a specific data base and noise model. The data base used to test the performance of the radar target identification algorithms developed here is a unique set of measurements made on scale models of aircraft. Measurements were made using the OSU/ESL Compact Radar Measurement Range. The range was operated in a broad-band (1-12 GHZ) mode and the full polarization matrix was measured. Calibrated values (amplitude and phase) of the RCS for the three polarization states were thus available. The polarization states are listed below. Author (GRA)

N86-24883# Army Aviation Systems Command, St. Louis, Mo.
VHF-FM COMMUNICATIONS ANTENNAS FOR PROJECT SINCGARS (UH-1 TAIL WHIP AND CABIN ROOF BENT WHIP EVALUATION)
Joseph Caralyus, Joseph Miller, Carlos Gratacos, and Frank Cansler Dec. 1985 103 p refs
(AD-A163561; USAAVSCOM-TR-85-E-3) Avail: NTIS HC A06/MF A01 CSCL 17/2

The American Electronics Laboratory (AEL), Allaire, NJ, was tasked by the U.S. Army Avionics Research and Development Laboratory (SAVAA-M), Fort Monmouth, NJ, to develop replacement breadband matching modules for the CU-942B and the FM 10-30-1 antenna to satisfy specified requirements for Project SINCGARS. AEL was further tasked to test various candidate antennas provided by commercial vendors that are mechanically interchangeable with the CU-942B and the FM 10-30-1. After completion of the AEL development/test program, AVRADA tasked an independent, non-based Government antenna test facility to conduct prescribed antenna verification tests in accordance with an agreed upon test plan. This technical report describes communications antenna systems provided by Dayton-Granger, Inc (DGI), American Electronics Lab (AEL), and Avionics Antenna Systems (AVANT). The test measurements were conducted at the Naval Air Development Center, Antenna Test Facility located in Warminster, PA. The information in this report provides, in part, the technical data for the protection data package of adequate VHF-FM Communications antennas for the UH-1 helicopter when used with the new SINCGARS Radio. Author (GRA)

N86-24884# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CIRCUITS AND EXCHANGE PARAMETERS AT THE C2 INTERFACE IN THE CASE OF SEQUENTIAL INPUT-OUTPUT OF DISCRETE INFORMATION
10 Jan. 1986 37 p refs
(AD-A163688; FTD-ID(RS)T-0010-86) Avail: NTIS HC A03/MF A01 CSCL 17/2

The present standard extends to circuits and exchange parameters between terminal data equipment (OOD) and data transmission equipment (APD) and the case of sequential input-output of data, and also to both sides of intermediate equipment, which can be hooked up between terminal data equipment and data transmission equipment. The standard establishes the nomenclature of the interface circuits, the electrical parameters of the signals sent over these circuits, and the technical requirements. Instructions on the selection of interface circuits are given in this appendix. The present standard is applicable to: (1) synchronous and asynchronous systems of data transmission; (2) the transmission of data over noncommutated communication channels when using connections between two points or a multipoint connection; (3) the transmission of data by way of a commutated network with the use of manual and automatic establishment of connection; (4) to short connecting cables between terminal data equipment data transmission equipment. GRA

N86-24885# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ELECTROMAGNETIC PULSE: THE FIFTH FACTOR IN THE IMPACT OF A NUCLEAR EXPLOSION
Zbigniew Jastak 16 Jan. 1986 33 p refs Transl. into ENGLISH from Przeglad Wojsk Ladowych (Poland), no. 7, Jul. 1971 p 100-119
(AD-A163695; FTD-ID(RS)T-1176-85) Avail: NTIS HC A03/MF A01 CSCL 18/3

Three ionization zones form during high-altitude nuclear explosions, (1) a short-lived ionization zone in the area of the nuclear explosion; (2) a radioactive cloud hovering over the center of the explosion. The cloud consists of ionized volatile products from the explosion and lingers for several hours or even days; and (3) a large zone ofincreased ionization resulting from gamma and x-ray radiation as well as from neutrons. The zone forms at an altitude of 40 to 70 kilometers and remains for several days. Increased ionization zones have an impact on radio wave propagation and interfere with radio communication as well as the operation of radar stations. Radiation emitted from the increased ionization zone can have an impact on changing the parameters of elements in electronic devices, especially semiconductors. This can in turn interfere with the operation of other equipment, including radio stations, radars, and infrared telescopes, and can also damage this equipment. GRA

N86-24886# Royal Signals and Radar Establishment, Malvern (England).
MODE S DATA LINK PHASE CODING
P. T. Humphrey and R. J. Larkin Jul. 1985 22 p refs
(AD-A163745; RSRE-MEMO-3859; DRIC-BR-98168) Avail: NTIS

HC A02/MF A01 CSCL 17/2

Suggested are some improvements to a proposed method of phrase coding for the Mode S Data Link and some testing of the phrase programming language described. Author (GRA)

N86-24887# Syracuse Univ., N. Y. Dept. of Electrical and Computer Engineering.

ELECTROMAGNETIC SCATTERING FROM A SLOTTED TM CYLINDRICAL CONDUCTOR BY THE PSEUDO-IMAGE METHOD Interim Technical Report

Joseph R. Mautz, Xingchao Yuan, and Roger F. Harrington Sep. 1985 59 p refs

(Contract DAAG29-84-K-0078)

(AD-A163782; SYRU/DECE/TR-85/3; ARO-21378.3-EL; IR-2) Avail: NTIS HC A04/MF A01 CSCL 20/14

The generalized network formulation for aperture problems is a well-established method for determining electromagnetic scattering from an aperture-perforated conducting surface. This method is easily implemented for an aperture in an infinite conducting plane because the field due to a sheet of magnetic current M on the surface of a conducting plane is, by the method of images, the field of 2M in free space. The method is more difficult to implement for an aperture in a curved conducting surface because the electric current induced by M on this surface can not be accounted for by imaging. This current must be calculated. Its calculated values are often inaccurate and so are those of the aperture field. In the present work, a more accurate aperture field is obtained for a particular TM curved cylindrical surface by means of the generalized network formulation for aperture problems in conjunction with a new method called the pseudo-image method. This aperture field was calculated by means of computer programs. GRA

N86-24888# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

ALGORITHM DEFINITION FOR THE VLSI DESIGN IMPLEMENTATION OF THE ELECTROMAGNETIC RADIATION INTEGRAL M.S. Thesis

Lawrence E. Jones Dec. 1985 131 p refs

(AD-A163825; AFIT/GE/ENG/85D-23) Avail: NTIS HC A07/MF A01 CSCL 20/14

A classic method used to solve for the electric (E) and magnetic (H) fields produced by a radiating source involves first solving for the vector potential (A) through the evaluation of the radiation integral. This study was undertaken to define a numerical algorithm that solves for A, so that a reduction in computation time can be realized through VLSI design implementation. Fast Fourier Transforms, Newton-Cotes numerical integration, and variable parameterization, were applied to the problem with unsuccessful results. A numerical summation approximation proved to have all the desired qualities for the algorithm. Verification of the numerical solution was accomplished by comparing the results it produced for a dipole antenna with a triangular shaped current density against the far-field approximation, and an incomplete cylindrical functions solution developed by Lee. Solution for E and H involves taking derivatives of A. Complications that arise from numerical techniques dictate that numerical differentiation should be performed before numerical integration. GRA

N86-24889# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

PHYSICAL OPTICS MODEL OF SIDE LOBE NULLING BY DISCS ON A PARABOLIC REFLECTOR M.S. Thesis

Dick A. Trapp Dec. 1985 90 p refs

(AD-A163826; AFIT/GE/ENG/85D-51) Avail: NTIS HC A05/MF A01 CSCL 20/14

By mounting small disc reflectors that are moveable relative to the inner reflector surface of a parabolic dish antenna, nulls can be generated in the side lobe region of the power radiation pattern with minimal distortion effects to the main beam. A physical optics model of this antenna system is developed to investigate in a simplified direct manner the phenomena of phase nulling caused by disc movement. Array theory using isotropic radiators is used to sample the aperture distribution to approximate the far field electric field of the dish. A physical optics approximation for scattering off a flat metal disc is used for discs and feed blockage effects. GRA

N86-24890# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

CHARACTERISTICS OF BAYESIAN MULTIPLE MODEL ADAPTIVE ESTIMATION FOR TRACKING AIRBORNE TARGETS M.S. Thesis

Allan S. Netzer Dec. 1985 336 p refs

(AD-A163830; AFIT/GAE/ENG/85D-2) Avail: NTIS HC A15/MF A01 CSCL 17/5

Previous studies at the Air Force Institute of Technology have led to the development of a multiple model adaptive filter (MMAF) tracking algorithm which provides significant improvements in tracker performance against highly-dynamic airborne targets over the currently used correlation trackers. A forward looking infra-red (FLIR) sensor is used to provide a target shape function to the tracking algorithm in the form of an 8 x 8 array of intensities projected onto a field of view (FOV). This target image measurement is correlated with an estimate of the target image template, to produce linear offset pseudo-measurements from the center of the FOV, which are provided as measurements to a bank of linear Kalman filters, in the multiple model adaptive filtering (MMAF) structure. The output of the MMAF provides the state estimates used in pointing the FLIR sensor, and generating the new target image estimate. This study investigates the characteristics of this algorithm in order to evaluate its performance against various target scenarios. Author (GRA)

N86-24891# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

DESIGN METHODOLOGY OF AN AUTOMATED SCATTERING MEASUREMENT FACILITY M.S. Thesis

David G. Mazur Dec. 1985 108 p refs

(AD-A163896; AFIT/GE/ENG/85D-26) Avail: NTIS HC A06/MF A01 CSCL 17/9

This thesis addresses the design methodology surrounding an automated scattering measurement facility. A brief historical survey of radar cross-section (RCS) measurements is presented. The electromagnetic theory associated with a continuous wave (CW) background cancellation technique for measuring RCS is discussed as background. In addition, problems associated with interfacing test equipment, data storage and output are addressed. The facility used as a model for this thesis is located at the Air Force Institute of Technology, WPARB, OH. The design methodology applies to any automated scattering measurement facility. A software package incorporating features that enhance the operation of AFIT's facility by students is presented. Finally, sample output from the software package illustrate formats for displaying RCS data. GRA

N86-24892# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

AIRBORNE BISTATIC RADAR LIMITATIONS AND SAMPLE CALCULATIONS M.S. Thesis

William P. Thomson Dec. 1985 127 p refs

(AD-A163941; AFIT/GE/ENG/85D-49) Avail: NTIS HC A07/MF A01 CSCL 17/9

This thesis examined the effects of system configuration and transmitted waveform as applied to an airborne bistatic radar. The study concentrates on the limiting effects of the transmitted signal parameters, the signal to clutter ratio, and the Doppler spread of the receiver beam. The analysis was performed by constructing a computer model to graphically display the results of the applicable equations. The equations developed in this study are: The power limited equation, the isorange equation, the isodoppler equation, and the signal to clutter ratio. These equations and those of ellipsoidal geometry were used to develop the bistatic radar model. GRA

N86-24893# Department of the Air Force, Washington, D.C.
INTERACTIVE COMMUNICATION CHANNEL Patent
Robert H. Chan, inventor (to Air Force), Martin R. Mann, inventor (to Air Force), and John A. Ciarrocchi, inventor (to Air force) Issued 8 Oct. 1985 30 p
(AD-D011968; US-Patent-4,546,429; US-Patent-Appl-SN-686954; US-Patent Class-364200) Avail: US Patent and Trademark Office CSCL 17/2

Discussed is an interactive communications channel (ICC) for providing a digital computer with high-performance multi-channel interfaces. Sixteen full duplex channels can be serviced in the ICC with the sequence or scan pattern being programmable and dependent upon the number or channels and their speed. A channel buffer system is used for line interface, and character exchange. The channel buffer system is on a byte basis. The ICC performs frame start and frame end functions, bit stripping and bit stuffing. Data is stored in a memory in block format (256 bytes maximum) by a program control and the ICC maintains byte address information and a block byte count. Data exchange with a memory is made by cycle steals. Error detection is also provided for using a cyclic redundancy check technique. GRA

N86-24894# Aerospace Corp., El Segundo, Calif. Chemistry and Physics Lab.
A COMPREHENSIVE MODEL OF THE PHOTOPHORETIC FORCE ON A SPHERICAL MICROPARTICLE
Antonio B. Pluchino and Steve Arnold 23 Aug. 1985 17 p
(Contract F49620-80-C-0077; Grant NSF ATM-84-13574)
(AD-A163022; ATR-85(8463)-2) Avail: NTIS HC A02/MF A01 CSCL 20/6

Recently there has been a great deal of interest in the local field which is produced by electromagnetic radiation on the surface and within the interior of a microparticle. The photophoretic force is described by a comprehensive model containing aspects of both the optical local field and gas dynamic properties. It is shown that the model is in good agreement with detailed experimental data, and provides a new means for measuring optical constants of microparticles. GRA

N86-24895# Systems Control Technology, Inc., Palo Alto, Calif.
TIME DOMAIN ALGORITHMS Final Report, Apr. 1984 - Apr. 1985
Benjamin Friedlander and J. O. Smith Sep. 1985 143 p
(Contract F30602-84-C-0016)
(AD-A163054; PA-6502-01; RADC-TR-85-167) Avail: NTIS HC A07/MF A01 CSCL 17/2

Research results aimed at addressing signal processing issues related to the non-stationary time-varying nature of signals propagating through communication channels are summarized. The Constant Modulus Algorithm is studied and extended and a convergence proof is provided. A class of time-varying waveguide digital filters is derived and its properties analyzed. The application of time-varying autoregressive models to modeling a class of non-stationary signals is presented. GRA

N86-24896# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
COMPARISON OF BACKGROUND CHARACTERISTICS OF AN RCS (RADAR CROSS SECTION) MEASUREMENT RANGE USING A CW-NULLING TECHNIQUE AND A PULSE-GATING TECHNIQUE M.S. Thesis
George R. Simpson Dec. 1985 109 p refs
(AD-A163965; AFIT/GE/ENG/85D-40) Avail: NTIS HC A06/MF A01 CSCL 17/9

This thesis compares the relative performance of a CW-nulling technique versus a pulse-gating technique for radar cross section (RCS) measurements. The purpose is (1) to provide a detailed comparison of these two systems in terms of system noise figure and systems losses, and (2) to demonstrate the effectiveness of time-separating the target area from the surrounding chamber when using the pulse-gating technique. The pulse-gating system is shown to have far superior system noise figure characteristics than the CW-nulling system. Pulse-gating has only a slightly greater system loss due to the added complexity of the pulse modulating and range gating components. The combined effect is that the pulse-gating technique is capable of improving signal-to-noise, thus increasing the reliability of making accurate RCS measurements. GRA

N86-24897# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
REAL-TIME FLIGHT TEST PCM DATA ACQUISITION MONITOR M.S. Thesis
John R. Croasdale Sep. 1985 268 p refs
(AD-A164035; AFIT/GE/ENG/85S-1) Avail: NTIS HC A12/MF A01 CSCL 17/2

A computer based system utilizing an inexpensive off-the-shelf personal computer and original interface design centered around a 68000 microprocessor for real-time monitoring of a time division multiplexed pulse code modulated (TDM/PCM) data stream was designed and constructed. This system is a prototype of a low-cost, portable PCM data acquistion monitor intended for use in flight test programs by the 4950th Test Wing at Wright-Patterson AFB, Oh. It will accept a single Armed Forces Instrumentation Standard NRZ or split-phase (Manchester) baseband data stream at rates up to 100 KBPS, display selected data words in graphical or numerical format, and alarm the user when data exceeds certain limits. It will provide a real-time verification that the data being generated and recorded during a test is of acceptable quality, allowing the option of continuation of the test, or termination. The system is capable of automatically determining the data rate and signaling format and synchronizing itself with the incoming signal. GRA

N86-24898# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
SIMULATION OF CHAFF CLOUD SIGNATURE M.S. Thesis
Richard P. Fray Dec. 1985 58 p refs
(AD-A164106; AFIT/GE/ENG/85D-16) Avail: NTIS HC A04/MF A01 CSCL 17/4

In this thesis time-varying radar cross sections of chaff clouds are generated for use in radar/ECM computer simulations, under the assumption that scattering from chaff clouds is a wide sense stationary random process. For a jointly gaussian random process, second order statistics are developed from correlated samples of radar cross sections. Applicable statistical tests are performed to validate a set of generated samples. The goodness of fit of the samples compared to the prespecified density function is determined along with a comparison of the correlation coefficients from the generated set to the desired correlation coefficients. Rayleigh and Weibull statistics are also derived from gaussian variables to present an alternative way of describing the probability distributions of chaff cloud cross sections. Topics for further study are suggested. GRA

N86-24899# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
ANALYSIS OF INTEGRATED AND NONINTEGRATED VOICE AND DATA NETWORKS FOR DOD COMMUNICATIONS M.S. Thesis
Stephen L. Walker Sep. 1985 146 p refs
(AD-A164176; AFIT/GCS/ENG/85S-2) Avail: NTIS HC A07/MF A01 CSCL 17/2

The primary question to be addressed in this thesis is: what is the best switching approach, with or without voice and data integration, that will maximize mission essential needs of DOD communications? This question can be answered by modeling integrated voice and data networks and separate voice and data networks. Included in this modeling will be the analysis of different switching techniques to determine the best switching approach. Mathematical analysis results are used to verify a simulation model. This simulation model is used to analyze different possibilities of meeting DOD requirements. These DOD requirements and performance criteria for switching are defined and presented in chapter II. Specific conditions are set to insure performance changes based on the switching techniques, and the percentages of voice and

data in a system. The approach taken in this research was to use analytical techniques and to develop a simulation model for analyzing different voice and data integrated and nonintegrated environments. GRA

N86-24900# Naval Postgraduate School, Monterey, Calif.
JAMMING EFFECTS ON DIGITAL COMMUNICATION RECEIVERS (TIMING ERRORS AND FREQUENCY ERRORS) M.S. Thesis
Suk H. Lee Dec. 1985 88 p refs
(AD-A164199) Avail: NTIS HC A05/MF A01 CSCL 17/4

A refinement of the results obtained for optimum energy constrained jamming of digital receivers is obtained by modeling the jammer as a random process. In the modeling process, a random time arrival or random frequency errors are accounted for by including these effects in the representation of the jamming waveforms. Performance analyses are carried out in order to determine the effect of random time of arrival and random frequency errors on the part of the jammer, on the receiver probability of error. The mathematical results derived are programmed, evaluated on the computer, and compared against ideal optimum energy constrained jamming strategies previously studied. Results for both coherent and incoherent receivers are derived and analyzed utilizing conventional binary modulation schemes. Results show that generally some but not a great deal of jammer effectiveness is lost due to random time arrival or random frequency errors associated with the jammer waveform. GRA

N86-24901# Naval Postgraduate School, Monterey, Calif.
OPTIMAL ESTIMATION OF TARGET IN CLUTTER (CHAFF) FROM RADAR M.S. Thesis
Akylas D. Katsicogiannis Dec. 1985 80 p refs
(AD-A164200) Avail: NTIS HC A05/MF A01 CSCL 17/9

This work produced a simulation capable of giving the effectiveness of chaff used in the self-protective mode. Signal processing techniques were studied in chaff discrimination in crucial missile conditions. A missile-ship-chaff model will be constructed to provide the optimum confusion of the missile. The radar included in this simulation is a tracking radar with conical-scan modulation. Results of simulation runs illustrate the effects of varying chaff radar cross section when ship and chaff are in the same resolution cell. GRA

N86-24902# National Oceanic and Atmospheric Administration, Boulder, Colo. Space Environment Lab.
OMEGA LONG-TERM PHASE ADVANCES
H. H. Sauer, W. N. Spjeldvik, and F. K. Steele Jun. 1985 55 p Prepared in cooperation with National Telecommunications and Information Administration, Boulder, Colo.
(PB85-233211; NOAA-TM-ERL-SEL-73) Avail: NTIS HC A04/MF]en1] A01 CSCL 17G

Anomalous advances of OMEGA Navigation System 10.2-kHz signals during three extended periods (totaling 60 days) of solar cosmic ray event activity during 1982 are examined and compared with energetic proton, alpha particle, and electron precipitation into the polar cap ionoshere. Time profiles of the OMEGA 10.2-kHz Hawaii-to-Norway path phase advance are found to be almost congruent with the time profiles of the logarithms of the fluxes of energetic protons precipitating into the polar cap as determined from instruments aboard the polar-orbiting NOAA-6 satellite and the GOES-2 geostationary satellite. Although both energetic alpha particles and electrons contribute to the anomalous phase advance experienced by the 10.2-kHz Hawaii-to-Norway OMEGA signal, a simple, empirical algorithm reasonably relates the observed phase advance to the observed differential fluxes of 6-MeV solar cosmic ray protons. GRA

N86-24903# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
TECHNICAL EVALUATION REPORT ON THE ELECTROMAGNETICWAVE PROPAGATION PANEL SYMPOSIUM ON PROPAGATION EFFECTS ON MILITARY SYSTEMS IN THE HIGH LATITUDE REGION
R. D. Hunsucker Nov. 1985 15 p
(AGARD-AR-218; ISBN-92-835-1514-7) Avail: NTIS HC A02/MF A01

Propagation effects on military systems in the high latitude region were examined. Topics discussed include: experimental studies of ionospheric irregularities and regular structure, results of ionospheric modification (HF heating) experiments,theoretical studies of ionospheric irregularity formation, global survey of ground conductivities,disturbance modeling studies, high latitude effects on HF radio communicaton, transionospheric communications, satellite synthetic aperture radar (SAR), MF radio broadcasting, spatially adaptive propagation, HF digital, Skywave HF sea state radar, and meteor burst communication. E.A.K.

N86-24904 Texas Univ., Austin.
SPECTRAL CHARACTERISTICS OF RADAR ECHOES FROM AIRCRAFT-DISPENSED CHAFF Ph.D. Thesis
Wilmot Jackson Estes 1985 203 p
Avail: Univ. Microfilms Order No. DA8529841

Experimental amplitude and phase measurements of radar echoes from chaff both in the wake of the dispensing aircraft (new chaff) and after the aircraft has left the area (mature chaff) are described. UHF and X-band coherent radars are used to obtain experimental data for both continuously-dispensed chaff and discrete chaff units. The mean radial velocity v sub 0 and the velocity standard deviation o sub v of the chaff cloud are estimated from complex-envelope spectraldensity estimates. No apparent correlation between the magnitude of o sub v and either radar frequency of chaff type is found. A theoretical model is developed which relates the complex-envelope spectral density to the probability density function of the dipole radial velocities. This model is used in the derivation of expressions which show the effects of range-gate movement and conical scanning on the spectral density. The theoretical model is also used to characterize the distribution of pulse-to-pulse phase changes. Experimental amplitude and phase measurements of radar echoes from chaff both in the wake of the ectiveness of chaff as a countermeasure against radars and guided missiles. Dissert. Abstr.

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

N86-24905*# Georgia Inst. of Tech., Atlanta. Microelectronics Research Center.
THEORETICAL AND MATERIAL STUDIES ON THIN-FILM ELECTROLUMINESCENT DEVICES Monthly Report, 1 Apr. - 30 Sep. 1985
C. J. Summers and K. F. Brennan Feb. 1986 47 p refs
(Grant NAG1-586; Proj. A-4168)
(NASA-CR-176710; NAS 1.26:176710; MR-1) Avail: NTIS HC A03/MF A01 CSCL 09A

Electroluminescent materials and device technology were assessed. The evaluation strongly suggests the need for a comprehensive theoretical and experimental study of both materials and device structures, particularly in the following areas: carrier generation and multiplication; radiative and nonradiative processes of luminescent centers; device modeling; new device concepts; and single crystal materials growth and characterization. Modeling of transport properties of hot electrons in ZnSe and the generation of device concepts were initiated. B.G.

N86-24906*# Hughes Research Labs., Torrance, Calif.
DESIGNING A 25-KILOWATT HIGH FREQUENCY SERIES RESONANT
R. R. Robson Apr. 1984 16 p refs Presented at POWERCON

11, 11th Annual International Power Electronics Conference and Exhibit, Dallas, Tex., 9-13 Apr. 1984
(Contract NAS3-23159)
(NASA-CR-176774; NAS 1.26:176774) Avail: NTIS HC A02/MF A01 CSCL 09C

The feasibility of processing 25 kW of power with a single, transistorized, 20 kHz, series resonant converter stage has been demonstrated by the successful design, development, fabrication, and testing of such a device. It employs four Westinghouse D7ST transistors in a full-bridge configuration and operates from a 250-to-350-Vdc input bus. The unit has an overall worst-case efficiency of 93.5% at its full rated output of 1000 V and 25 A dc. A solid-state dc input circuit breaker and output-transient-current limiters are included in and integrated into the design. Circuit details of the converter are presented along with test data. Author

N86-24907*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ANALYSIS OF OPTICALLY CONTROLLED MICROWAVE/ MILLIMETER WAVE DEVICE STRUCTURES
Rainee N. Simons and Kul B. Bhasin 1986 17 p refs Presented at International Microwave Symposium, Baltimore, Md., 2-4 Jun. 1986; sponsored by IEEE
(NASA-TM-87246; E-2926; NAS 1.15:87246) Avail: NTIS HC A02/MF A01 CSCL 09C

The light-induced voltage and the change in the source-to-drain channel current under optical illumination higher than the semiconductor bandgap for GaAs MESFET, InP MESFET, Al0.3Ga0.7As/ GaAs high electron mobility transistor (HEMT) and GaAs permeable base transistor (PBT) were analytically obtained. The GaAs PBT and GaAs MESFET have much higher sensitivity than InP MESFET. The Al0.3Ga0.7As/GaAs HEMT is observed to have the highest sensitivity. Variation in device parasitics due to optical illumination and its effect on the cutoff frequencies f sub T and f sub max are also investigated. Author

N86-24908*# National Aeronautics and Space Administration. Pasadena Office, Calif.
FLOATING EMITTER SOLAR CELL JUNCTION TRANSISTOR Patent Application
Chih Tang Sah, inventor (to NASA) and Li-Jen Cheng, inventor (to NASA) Filed 11 Mar. 1986 26 p
(Contract NAS7-919)
(NASA-Case-NPO-16467-1-CU; NAS 1.71:NPO-16467-1-CU; US-Patent-Appl-SN-838648) Avail: NTIS HC A03/MF A01 CSCL 09A

A front surface contact floating emitter solar cell transistor is provided in a semiconductor body (n-type), in which floating emitter sections (p-type) are diffused or implanted in the front surface. Between the emitter sections, a further section is diffused or implanted in the front surface, but isolated from the floating emitter sections, for use either as a base contact to the n-type semiconductor body, in which case the section is doped n+, or as a collector for the adjacent emitter sections, in which case the section is doped p+. In the first case, the structure is diffused or implanted p+ on the back in a section that serves as a collector, and in the second case the structure is diffused or implanted n+ all across the back to serve as a base contact. In either case, the semiconductor material on the back may be a starting substrate of suitably doped semiconductor material. A major advantage is that no wafer edge groove is necessary since the floating emitter solar cell transistors are isolated from saw damge, so long as a cut is not made through the well. NASA

N86-24909*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FLAT-PANEL, FULL-COLOR ELECTROLUMINESCENT DISPLAY Patent Application
James B. Robertson, inventor (to NASA) Filed 3 Dec. 1985 13 p
(NASA-Case-LAR-13407-1; NAS 1.71:LAR-13407-1; US-Patent-Appl-SN-804196) Avail: NTIS HC A02/MF A01 CSCL 09A

This invention relates to a flat-panel, electroluminescent display capable of achieving full color and is particularly useful in achieving a bright display with high resolution. The invention uses red, green and blue phosphors in two layers separated by layers of insulating material and layers of electrodes that are used to excite the electrodes. In operation, the display is addressed by supplying sufficient voltage between selected electrodes. This places an electric field across the phosphor at each picture element located between the overlap of the selected electrodes, causing the phosphor to emit light at this location. The display can be addressed in line-at-a-time fashion in rapid enough sequence to display information at standard TV frame rates. The novelty of this invention resides in the combining of a partial side-by-side design with a partial stacked layer design to produce a flat-panel, full-color display which has a better combination of resolution, brightness, contrast ratio and fabrication simplicity than any of the prior designs. Author

N86-24910# National Aeronautics and Space Administration, Washington, D.C.
MICROWAVE TUBE COLLECTORS. COLLECTOR SYSTEMS OF UHF DEVICES WITH LONGITUDINAL INTERACTIONS
A. N. Sandalov and V. E. Rodyakin Mar. 1986 32 p refs Transl. into ENGLISH from Radioelektronika (USSR),no. 3, 1984 p 63-76 Transl. by Kanner (Leo) Associates, Redwood City,iCalif.
(Contract NASw-4005)
(NASA-TM-88399; NAS 1.15:88399) Avail: NTIS HC A03/MF A01 CSCL 09C

A comparison is made of different types of collectors in UHF devices. The main problems involved in designing collectors are discussed with a survey of available literature. It is concluded that improvement in the methods of theoretical study makes it possible to reduce the weight and dimensions of collectors thus increasing the safety and service life of UHF devices with longitudinal interaction. Author

N86-24911# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A METHOD FOR FABRICATING MAGNETODIELECTRIC CORES
Yu. M. Alter, V. P. Geraskov, Yu. G. Kiryanov, A. S. Sakhiyev, and G. V. Korolev 20 Dec. 1985 5 p refs Transl. into ENGLISH from Russian Patent no. 343310 (28 Aug. 1972) p 1-2
(AD-A163457; AD-E401440; FTD-ID(RS)T-1228-85) Avail: NTIS HC A02/MF A01 CSCL 20/3

This patent relates to a method for fabricating magnetodielectric cores based on carbonyl iron, which are used in radio-electronic equipment. The method described in this patent is distinguished by the fact that, in order to simplify the manufacturing process, a low-viscosity monomer, selected from a group containing alkylene-, oxyalkylene dimethacrylate in the amount from 3 to 6 weight %, is used as the binding reagent. Heat treatment is done at 75 to 90 C. GRA

N86-24912# Naval Civil Engineering Lab., Port Hueneme, Calif.
TEST RESULTS FOR THE 2.5-kVA GROUND FAULT PROTECTOR Final Report, Jan. 1982 - Sep. 1984
L. Tucker Sep. 1985 47 p refs
(AD-A163501; NCEL-TN-1734) Avail: NTIS HC A03/MF A01 CSCL 09/3

Divers using electrical equipment are exposed to shock hazards. The Naval Civil Engineering Laboratory tested commercially available ground fault protection devices designed for terrestrial use and found that none of them met Navy BUMED criteria for protection against electrical shock. NCEL then developed a prototype model ground fault protection system that could meet the BUMED criteria. This prototype incorporated the most desirable features of the commercial systems. The prototype was capable of detecting low-level (less than 5 mA) currents and shutting down in 10 msec or less. Author (GRA)

N86-24913# Naval Postgraduate School, Monterey, Calif.
SIMULATION AND PERFORMANCE OF BRUSHLESS dC

MOTOR ACTUATORS Progress Report, Oct. 1984 - Sep. 1985
Alex Gerba, Jr. Dec. 1985 48 p refs
(AD-A163725; NPS69-85-028) Avail: NTIS HC A03/MF A01 CSCL 10/2

The simulation model for a Brushless D.C. Motor and the associated commutation power conditioner transistor model are presented. The necessary conditions for maximum power output while operating at steady-state speed and sinusoidally distributed air-gap flux are developed. Comparison of simulated model with the measured performance of a typical motor are done both on time response waveforms and on average performance characteristics. These preliminary results indicate good agreement. Plans for model improvement and testing of a motor-driven positioning device for model evaluation are outlined. Author (GRA)

N86-24914# EMTEC Engineering, Inc., Los Angeles, Calif.
CONFIGURATION STUDY OF NEW LOW-LOSS MM (MILLIMETER) WAVE GUIDING STRUCTURES Final Report, 1 Oct. 1984 - 30 Sep. 1985
Cavour Yeh 12 Nov. 1985 14 p refs
(Contract DAAG29-84-C-0025)
(AD-A163784; MM-85-1; ARO-22454.1-PH-S) Avail: NTIS HC A02/MF A01 CSCL 09/1

The result of the research carried out at EMtec Engineering, Inc., Los Angeles, under Contract DAAG 29-84-C-0025 with the Army Research Office is discussed. The primary objective was to learn whether there exists a dielectric waveguide configuration which offers lower loss figure than a circular dielectric rod. Important evidence was found which showed that it is feasible to optimize a configuration to achieve low-loss guidance of mm waves. Future research areas are also described. GRA

N86-24915# Aerospace Corp., El Segundo, Calif. Materials Science Lab.
PARTIAL-DISCHARGE TESTS OF MULTIWINDING HIGH-VOLTAGE TRANSFORMERS FOR SPACE TWTAS (TRAVELING-WAVE TUBE AMPLIFIERS)
Francis Hai and Kenneth W. Paschen 23 Sep. 1985 70 p refs
(Contract F04701-83-C-0084)
(AD-A163882; TR-0084A(5935-03)-1; SD-TR-85-64) Avail: NTIS HC A04/MF A01 CSCL 09/1

The high-voltage transformer is a key component in the power supply, converting a single low voltage from the power bus of a communication satellite to multiple high voltages required by a traveling-wave tube amplifier. Partial-discharge (corona) tests (PDT) are performed on this component to establish high-voltage integrity and to screen out units with high-voltage defects. These defects are usually voids and cracks occurring in the insulation of the transformer. Investigations conducted to determine how to perform effective partial-discharge tests on transformers to screen out defective units are discussed. The aspects of partial-discharge testing that were examined include (1) the test medium (air, vacuum, or dielectric fluid); (2) the test mode (60 Hz ac, ac on dc, or dc); (3) the test configuration (i.e., the testing of each insulation barrier in sequence or the simultaneous testing of all barriers); (4) test voltage magnitude (to four times the operating voltage); (5) test data; and (6) pass/fail criteria. Destructive physical analysis (DPA) was performed on both defective and defect-free transformers to confirm the effectiveness of the recommended PDT procedures. GRA

N86-24916# California Univ., Berkeley. Electronics Research Lab.
RESEARCH ON DEVICES FOR INTEGRATED MILLIMETER WAVE SYSTEMS Final Report, 18 Jun. 1979 - 31 Jul. 1985
S. E. Schwarz Oct. 1985 11 p refs
(Contracts DAAG29-82-K-0166; DAAG29-79-C-0134)
(AD-A163903; ARO-19300.4-EL; ARO-16472.7-EL) Avail: NTIS HC A02/MF A01 CSCL 09/5

Planar technology for millimeter wave circuits has been studied. Coplanar waveguide filters have been developed. A fully planar monolithic 35-GHz oscillator and a planar 70-GHz receiver have been built. GRA

N86-24917# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
ARITHMETIC CIRCUITRY FOR HIGH SPEED VLSI WINOGRAD FOURIER TRANSFORM PROCESSOR M.S. Thesis
Paul W. Coutee Dec. 1985 132 p refs
(AD-A163943; AFIT/GE/ENG/85D-11) Avail: NTIS HC A07/MF A01 CSCL 09/5

The objective of this thesis is to define, design, and implement an efficient VLSI architecture which computes the Discrete Fourier Transform using the Winograd Fourier Transform Algorithm. The architecture includes circuitry to perform input/output, WFT calculations, parity checking and generation, and scale factor generation. GRA

N86-24918# Department of the Air Force, Washington, D.C.
ORIENTATION OF CIRCULAR CONNECTORS USING VISION PROCESSING Patent Application
William P. McConnell, inventor (to Air Force) Filed 3 Dec. 1985 29 p refs
(AD-D012153; US-Patent-Appl-SN-804201) Avail: NTIS HC A03/MF A01 CSCL 09/2

The determination of the angular orientation of circular connectors is made using a first and second camera in order to enable an automated system to successfully connect cables. Vision processing is used to locate a key and keyway on a metal ring forming an annular mating surface on each male and female mating surface. As the first camera records an image of the male connector, the threshold between black and white is adjusted so that the keyway appears in the form of a break in the metal ring around the connector. As the second camera observes the female connector, the threshold between black and white is adjusted by a control signal from the automated system so that the keys appear as protrusions from an unbroken ring. Finally, by isolating the background beyond a certain radius, the first and second cameras are able to produce a first and second video signal in which the plurality of pins and holes in each connector are isolated against a background. The first and second video signals thereby contain sufficient information to enable the automated system to successfully connect cables while maximizing unattended operation times. GRA

N86-24919# Department of the Air Force, Washington, D.C.
METHOD OF MAKING A RESONATOR HAVING A DESIRED FREQUENCY FROM A QUARTZ CRYSTAL RESONATOR PLATE Patent Application
John R. Vig, inventor (to Air Force) Filed 17 Jan. 1986 24 p refs
(AD-D012157; US-Patent-Appl-SN-819652) Avail: NTIS HC A02/MF A01 CSCL 09/1

The general object of this invention is to provide a method of making a resonator from a quartz crystal resonator plate. A more particular object of the invention is to provide such a method in which the resonator will have a desired frequency. A further object of the invention is to provide such a method of making a high frequency fundamental mode resonator in which the resonator will have a desired frequency. A still further object of the invention is to provide such a method that is dry, that is inexpensive to set up and operate, that produces no surface damage or high levels of ionizing radiation, that permits the direct and precise monitoring of the resonator frequency during the method, that permits the independent adjustment of individual electrodes on multiple electrode devices (such as monolithic crystal filters), and that minimizes the aging due to oxidation of the electrodes. It has been found that the aforementioned objects can be attained by a method including the steps of etching the quartz crystal resonator plate to a frequency slightly higher than the desired frequency, and depositing metallic electrodes onto the active area of the resonator plate to lower the frequency that very closely approaches the desired frequency. GRA

N86-24920# Massachusetts Inst. of Tech., Lexington. Lexington Lab.
LOW PASS FILTERS WITH LINEAR PHASE

Robert M. Lerner 12 Dec. 1985 46 p refs
(Contract F19628-85-C-0002)
(AD-A163984; TR-729; ESD-TR-85-240) Avail: NTIS HC A03/MF A01 CSCL 09/5

This report is intended as a modern sequel to Band Pass Filters with Linear Phase, published over 20 years ago. Here, the linear phase algorithms are adapted to low-pass integrated active circuit topologies for potential use as the input filter in sampled data control systems and other low-pass applications for which traditional coil-capacitor-transformer filter designs are no longer appropriate. The linear phase algorithm is applicable to a variety of circuit topologies which are not mathematically equivalent. Application to the overall transfer function (the simple approach) results in transmission that is nearly equal-ripple in both amplitude and phase, the errors being equivalent to echos in a misterminated transmission line. The resulting filters compare favorably with modest order Tchebychef filters (lacking phase control). Application to branches of a feedback topolgy (mathematically equivalent to a lattice) leads to control of echoes and stop-band zeros at the cost of extra elements. The results compare favorably with ordinary Butterworth filters (lacking phase control) having the same total number of poles. Practical means for inserting stop band zeros without redesign of the pass-band are considered. Circuits of both the R-C and switchcap types are discussed. Author (GRA)

N86-24921# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
CONTROL CIRCUITRY FOR HIGH SPEED VLSI (VERY LARGE SCALE INTEGRATION) WINOGRAD FOURIER TRANSFORM PROCESSORS M.S. Thesis
Paul C. Rossbach Dec. 1985 352 p refs
(AD-A164043; AFIT/GE/ENG/85D-35) Avail: NTIS HC A16/MF A01 CSCL 09/5

The calculation of the Discrete Fourier Transform has long been a significant bottleneck in many Digital Signal Processing applications. With the arrival of Very Large Scale Integration and new DFT algorithms, system architectures that significantly reduce the DFT bottleneck are possible. This thesis addresses the design, simulation, implementation, and testing of the control circuitry for a high speed, VLSI Winograd Fourier Transform (WFT) processor. Three WFT processors are combined into a pipelined architecture that is capable of computing a 4080-point DFT on complex input data approximately every 120 microseconds when operating with 70 MHz clock signals. The chip control architecture features a special Programmable Logic Array (PLA) to control the on-chip arithmetic circuitry, and a dense, 54K ROM to generate data addresses for the external RAM. The PLA controller was fabricated in 3 micron CMOS and functioned properly for clock rates of over 60 MHz. The address generator ROM was designed and submitted for fabrication in 3 micron CMOS, and SPICE simulations predict an access time of 60 nanoseconds. Software that automatically generates a ROM layout description from a data file was developed to ensure the correctness of the final design. The transistor minimization procedure i s based on a graph partitioning heuristic, and the drain removal procedure is based on an algorithm that near-optimally solves the Traveling Salesman Problem. GRA

N86-24922# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
STUDY AND ANALYSIS OF AlGaAs/GaA MODULATION DOPED FIELD-EFFECT TRANSISTORS INCORPORATING P-TYPE SCHOTTKY GATE BARRIERS M.S. Thesis
Kevin L. Priddy Dec. 1985 152 p refs
(AD-A164103; AFIT/GEO/ENG/85D-1) Avail: NTIS HC A08/MF A01 CSCL 09/5

The design and dc performance of enhanced Schottky barrier modulation doped transistors (ESMODFETs) is presented. The theory required to estimate the layer thicknesses and dopings required for a desired barrier height is developed. The experimental results show an increase from 0.8eV to 1.6eV for the ESMODFET versus the standard MODFET, with good correlation between theory and experiment. The ohmic contact resistance of the ESMODFET is comparable to that of the MODFET. The process used to fabricate the ESMODFET is similar to that used for the MODFET. GRA

N86-24923# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A MICROCOMPUTER-BASED MENU-DRIVEN CHIP LAYOUT LANGUAGE M.S. Thesis
Steven C. Morrese Dec. 1985 321 p refs
(AD-A164109; AFIT/GCS/ENG/85D-11) Avail: NTIS HC A14/MF A01 CSCL 09/5

The Menu Driven Chip Layout Language (MDCLL) is a microcomputer-based design tool used for representing the physical layout of integrated circuit designs in the Caltech Intermediate Form (CIF). MDCLL is based on the Chip Layout Language (CLL) created by Tim Saxe of Stanford University and as modified at the Air Force Institute of Technology. MDCLL leads the user through interactive menu-driven functions, allowing the user to represent a circuit design in CIF; however, the user sees a language similar to CLL even though the file is stored on disk as CIF. The output CIF file is suitable for use with other Computer Aided Design tools or for use in the fabrication process. MDCLL uses a cell-oriented design methodology in which the user defines cell, and then the user combines these cells with the necessary interconnects to form the layout of an entire integrated circuit. Cell interconnections are possible by placing wires, abutting cells, or by overlapping cells. The main functions of MDCLL are to create a new cell, delete a cell, place a cell, move a cell, modify a cell, interconnect cells, and print the CIF file of a cell. GRA

N86-24924# Ohio State Univ., Columbus. Electroscience Lab.
JOINT SERVICES ELECTRONICS PROGRAM Final Report, Oct. 1983 - Sep. 1985
R. G. Kouyoumjian, D. L. Moffatt, E. H. Newman, P. H. Pathak, and J. H. Richmond Dec. 1985 16 p refs
(Contract N00014-78-C-0049)
(AD-A164151; ESL-710816-19) Avail: NTIS HC A02/MF A01 CSCL 09/5

This document presents a brief overview in the following areas: (1) Time Domain Studies and Slope Diffraction Techniques Studies; (2) Hybrid Studies; (3) Diffraction Studies; (4) Time Domain or Transient Studies; (5) Integral Equation Studies; and (6) Microstrip antennas. GRA

N86-24925# General Electric Co., Schenectady, N. Y.
ADVANCED ARTIFICIAL DIELECTRIC MATERIALS FOR MILLIMETER WAVELENGTH APPLICATIONS. PART A Annual Technical Report, 1 Aug. 1984 - 30 Sep. 198
Israel S. Jacobs 30 Dec. 1985 36 p refs
(Contract N00014-83-C-0447)
(AD-A164195; Rept-85-SRD-030) Avail: NTIS HC A03/MF A01 CSCL 09/3

This is Part A of a two-part Annual Report. (Part B, dealing with magneto-dielectrics, is classified.) This part describes a continuation of work on artificial dielectric composites based on a polymeric binder and alloy powder particles that are oxide-coated for isolation and ferromagnetic below room temperature for packing determination. Characterization studies show the surface oxide on the alloy powder. Microstructural study of the composites shows wide variations in local packing density, characteristic of random loading. Permittivity measurements extended to 35 GHz correlate qualitatively with modern theories of heterogeneous media but evidence deviations that may arise from the observed clumping. Higher frequency measurements of permittivity and induced permeability are under way. An alternative inorganic binder material and process (with higher dielectric constant) has been developed with properties suitable for the morphological, electromagnetic, and mechanical requirements. GRA

N86-24926# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
KALMAN FILTER DESIGN FOR THE LONG RANGE INTERCEPT FUNCTION OF THE F-4E/G FIRE CONTROL SYSTEM M.S. Thesis

Robert C. Halbert Dec. 1985 366 p refs
(AD-A164205; AFIT/GE/ENG/85D-20) Avail: NTIS HC A16/MF A01 CSCL 17/9

This study examines reduced-order Kalman filters designed to improve performance of the F-4E/G long range air-to-air missile capability (LRI function). Operational requirements dictate a high degree of accuracy and constraints imposed by existing hardware mandate minimal complexity. Two linear dynamics models are proposed, one based on constant target velocity, and the other based on time-correlated target acceleration. Both are defined in inertial Cartesian coordinates aligned with north, east, and down. A nonlinear model is developed for measurements available in the existing F-4E/G hardware, including range, range rate, radar antenna gimbal angles, and radar antenna rates. The models are implemented in extended Kalman filter formulations employing linear propagation equations to avoid on-line numerical integration. Performance evaluations are performed on three test trajectories using Monte Carlo analysis. Filter tuning, error budgets, adaptive techniques, and observability issues are addressed during filter evaluation. Results of the evaluation indicate the filter designs can meet the requirements of the F-4E/G fire control system. Recommendations are made for continued testing and for operational implementation. GRA

N86-24927# Pittsburgh Univ., Pa. Center for Multivariate Analysis.
ON DETECTION OF NUMBER OF SIGNALS IN PRESENCE OF WHITE NOISE
L. C. Zhao, P. R. Krishnaiah, and Z. D. Bai Oct. 1985 30 p refs
(Contracts N00014-85-K-0292; F49620-85-C-0008)
(AD-A164211; TR-85-37; AFOSR-86-0039TR) Avail: NTIS HC A03/MF A01 CSCL 09/4

In this paper, the authors propose procedures for the detection of the number of signals in presence of Gaussian white noise. The methods used fall within the framework of the model selection procedures using an information theoretic criterion. The strong consistency of the estimates of the number of signals, under different situations, is established. Extensions of the results are also discussed for the case when the noise is not necessarily Gaussian. GRA

N86-24928# National Bureau of Standards, Gaithersburg, Md.
CALIBRATION OF TEST SYSTEMS FOR MEASURING POWER LOSSES OF TRANSFORMERS Final Report
O. Petersons and S. P. Mehta Sep. 1985 108 p refs Prepared in cooperation with ASEA Electric, Inc., Waukesha, Wis.
(PB86-132032; NBS/TN-1204) Avail: NTIS HC A06/MF A01; also available SOD HC $3.75 as 003-003-02677-8 CSCL 09C

A calibration system for accuracy verification and alignment of test systems for measuring transformer losses is described. Methodologies are presented for assessing measurement uncertainties and for evaluating overall accuracy of test systems. Procedures are suggested for continuing maintenance and calibration of standard instruments and test systems to ensure traceable measurements. GRA

N86-24929# National Bureau of Standards, Boulder, Colo. Electromagnetic Fields Div.
RADIO-FREQUENCY POWER DELIVERY SYSTEM: PROCEDURES FOR ERROR ANALYSIS AND SELF-CALIBRATION
M. Kanda and R. D. Orr Aug. 1985 28 p
(PB86-115680; NBS/TN-1083) Avail: NTIS HC A03/MF A01; also available SOD HC $1.00 as 003-003-02670-1 CSCL 09E

An expression was developed for net power delivered to a load in terms of the indicated forward and reflected power and the system S-parameters and reflection coefficients. The dual directional coupler is treated as nonideal with power reflections assumed between all ports. The system itself is used to evaluate the major S-parameter terms in net power computation, and uncertainty in the computed power is derived from origins in the power meter readings and incompletely known S-parameters. GRA

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N86-24930*# State Univ. of New York, Albany. Atmospheric Sciences Research Center.
WATER JET/SPRAY MEASUREMENT ANALYSIS Final Report
G. Garland Lala Jan. 1986 12 p refs
(NASA Order H-78743-B)
(NASA-CR-178802; NAS 1.26:178802) Avail: NTIS HC A02/MF A01 CSCL 20D

The objective of this study was to provide analysis of data obtained under a previous contract entitled Characterization of Drop Spectra from High Volume Flow Water Jets. Measurements of drop spectra were obtained in the spray resulting from the breakup of high volume flow water jets from a variety of nozzle types. The drop spectra measurements were obtained from two drop spectrometers covering a range from 10 microns to 12 millimeters diameter. The task addressed was to select representative spectra from the individual tests and provide analyses in both numerical and graphical formats as outlined in the proposal. The intended application of these results is an evaluation of the feasibility of fog clearing by high volume water sprays. During the tests, a fog event occurred making it possible to test the concept of fog clearing. Visual range data and fog drop spectra were analyzed, with particular emphasis placed on the modification of these parameters due to the water spray. Author

N86-24931*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Business Group.
BURNER LINER THERMAL/STRUCTURAL LOAD MODELING: TRANCITS PROGRAM USER'S MANUAL
R. Maffeo Aug. 1985 45 p refs
(Contract NAS3-23272)
(NASA-CR-174891; NAS 1.26:174891; R85AEB452) Avail: NTIS HC A03/MF A01 CSCL 20D

Transfer Analysis Code to Interface Thermal/Structural Problems (TRANCITS) is discussed. The TRANCITS code satisfies all the objectives for transferring thermal data between heat transfer and structural models of combustor liners and it can be used as a generic thermal translator between heat transfer and stress models of any component, regardless of the geometry. The TRANCITS can accurately and efficiently convert the temperature distributions predicted by the heat transfer programs to those required by the stress codes. It can be used for both linear and nonlinear structural codes and can produce nodal temperatures, elemental centroid temperatures, or elemental Gauss point temperatures. The thermal output of both the MARC and SINDA heat transfer codes can be interfaced directly with TRANCITS, and it will automatically produce stress model codes formatted for NASTRAN and MARC. Any thermal program and structural program can be interfaced by using the neutral input and output forms supported by TRANCITS. E.A.K.

N86-24932*# Brown Univ., Providence, R. I. Div. of Engineering.
CONTRIBUTIONS TO THE UNDERSTANDING OF LARGE-SCALE COHERENT STRUCTURES IN DEVELOPING FREE TURBULENT SHEAR FLOWS
J. T. C. Liu Apr. 1986 219 p refs
(Grants NAG1-379; NAG3-673; NSF MSM-83-20307; NSF INT-85-14196; NATO-343/85)
(NASA-CR-176772; NAS 1.26:176772) Avail: NTIS HC A10/MF A01 CSCL 20D

Advances in the mechanics of boundary layer flow are reported. The physical problems of large scale coherent structures in real, developing free turbulent shear flows, from the nonlinear aspects of hydrodynamic stability are addressed. The presence of fine

grained turbulence in the problem, and its absence, lacks a small parameter. The problem is presented on the basis of conservation principles, which are the dynamics of the problem directed towards extracting the most physical information, however, it is emphasized that it must also involve approximations. E.A.K.

N86-24933*# Kansas Univ. Center for Research, Inc., Lawrence.
STATISTICAL PREDICTION OF DYNAMIC DISTORTION OF INLET FLOW USING MINIMUM DYNAMIC MEASUREMENT. AN APPLICATION TO THE MELICK STATISTICAL METHOD AND INLET FLOW DYNAMIC DISTORTION PREDICTION WITHOUT RMS MEASUREMENTS Final Report
William G. Schweikhard and Yen-Sen Chen Apr. 1986 216 p refs 2 Vol.
(Grant NAG3-11)
(NASA-CR-176764; NAS 1.26:176764) Avail: NTIS HC A10/MF A01 CSCL 20D

The Melick method of inlet flow dynamic distortion prediction by statistical means is outlined. A hypothetic vortex model is used as the basis for the mathematical formulations. The main variables are identified by matching the theoretical total pressure rms ratio with the measured total pressure rms ratio. Data comparisons, using the HiMAT inlet test data set, indicate satisfactory prediction of the dynamic peak distortion for cases with boundary layer control device vortex generators. A method for the dynamic probe selection was developed. Validity of the probe selection criteria is demonstrated by comparing the reduced-probe predictions with the 40-probe predictions. It is indicated that the the number of dynamic probes can be reduced to as few as two and still retain good accuracy. E.A.K.

N86-24934*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
UNSTEADY HEAT TRANSFER AND DIRECT COMPARISON TO STEADY-STATE MEASUREMENTS IN A ROTOR-WAKE EXPERIMENT
J. E. OBrien, R. J. Simoneau, J. E. LaGraff (Syracuse Univ.), and K. A. Morehouse Jan. 1986 21 p refs Presented at the 8th International Heat Transfer Conference, San Francisco, Calif., 17-22 Aug. 1986
(NASA-TM-87220; E-2757; NAS 1.15:87220) Avail: NTIS HC A02/MF A01 CSCL 20D

Circumferentially local and time-resolved heat transfer measurements were obtained for a circular cylinder in crossflow located downstream of a rotating spoked wheel wake generator in a steady flow tunnel. The unsteady heat transfer effects were obtained by developing an extension of a thin film gauge technique employed to date exclusively in short-duration facilities. The time-average thin film results and conventional steady-state heat transfer measurements were compared. Time-averaged wake-induced stagnation heat transfer enhancement levels above the nowake case were about 10% for the four cylinder Reynolds numbers. This enhancement level was nearly independent of bar passing frequency and was related directly to the time integral of the heat transfer spikes observed at the bar passing frequency. It is observed that the wake-induced heat transfer spikes have peak magnitudes averaging 30 to 40% above the interwake heat transfer level. E.A.K.

N86-24935*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
LIQUID SEEDING ATOMIZER Patent Application
Henry L. B. Seegmiller, inventor (to NASA) Filed 31 Mar. 1986 12 p
(NASA-Case-ARC-11631-1; NAS 1.71:ARC-11631-1; US-Patent-Appl-SN-846428) Avail: NTIS HC A02/MF A01 CSCL 20D

An atomizer for a liquid having an air supply is described. Liquid supply tubes extend longitudinally along the air supply tube. The air supply tube has at least one air orifice extending from an inner surface of the tube through the tube. The liquid supply tubes are positioned on either side of the air orifices and the liquid tubes are sealed to the air supply tube. The liquid supply tubes with facing liquid orifices are positioned adjacent to each of the air orifices. The liquid supply tubes are laterally spaced apart at the liquid orifices at a distance less than the diameter of the air orifices to enable a beneficial venturi effect when the atomizer is in operation. NASA

N86-24936# National Aeronautics and Space Administration, Washington, D.C.
AN EXPERIMENTAL INVESTIGATION ON LOCATION OF BOUNDARY LAYER TRANSITION ON THE NACA 0012 USING SURFACE HOT FILM GAGES
Tie-cheng Wang Mar. 1986 10 p refs Transl. into ENGLISH from Acta Aeronautica et Astronautica Sinica, v. 5, no. 4, Dec. 1984 p 401-405 Original language document was announced in IAA as A85-43231 Transl. by SCITRAN, Inc., Santa Barbara, Calif. Original doc. was prep. by Nanjing Aeronautical Inst.
(Contract NASw-4004)
(NASA-TM-88285; NAS 1.15:88285) Avail: NTIS HC A02/MF A01 CSCL 20D

Hot film gages were attached flush to the upper surface of a NACA-type 0012 airfoil in order to locate the boundary layer transitions corresponding to a range of distances from the leading edge. The measurements were carried out in a low-speed wind tunnel at Nanjing Aeronautical Institute. During the wind-tunnel tests, Reynolds numbers were kept constant at 200,000 Re(b), while the angle of attack of the airfoil was varied continuously. The locations on the airfoil of boundary layer separation and turbulent boundary layer attachment are shown in a diagram. It is found that the location of boundary layer transitions using hot film gages is a feasible and practical technique. Author

N86-24937*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A COMPUTATIONAL STUDY OF MULTIPLE JET AND WALL INTERACTION
Warren Campbell Feb. 1986 13 p refs
(NASA-TM-86541; NAS 1.15:86541) Avail: NTIS HC A02/MF A01 CSCL 20D

In the fuel preburner of the Space Shuttle Main Engine, face plate, injector, and baffle erosion have been observed. The observed patterns of erosion suggest that flame attachment to the walls is a contributing factor. To better understand the physical phenomena involved, a portion of the preburner was modeled computationally. The simulated 'preburner' had three two-dimensional jets entering a cavity adjacent to a baffle. The computational model employed the Patankar Spalding algorithm with upwind differencing. The turbulence model was a standard k-epsilon model with wall functions. The effects of incoming boundary conditions on turbulent kinetic energy and dissipation, k and epsilon, was studied. The results indicate a very strong sensitivity to these boundary conditions over certain ranges of values. Author

N86-24938*# Garrett Turbine Engine Co., Phoenix, Ariz.
DILUTION JET MIXING PROGRAM, PHASE 3 Final Report
R. Srinivasan, E. Coleman, G. Myers, and C. White Sep. 1985 186 p refs
(Contract NAS3-22110)
(NASA-CR-174884; NAS 1.26:174884; GARRETT-21-5418) Avail: NTIS HC A09/MF A01 CSCL 20D

The main objectives for the NASA Jet Mixing Phase 3 program were: extension of the data base on the mixing of single sided rows of jets in a confined cross flow to discrete slots, including streamlined, bluff, and angled injections; quantification of the effects of geometrical and flow parameters on penetration and mixing of multiple rows of jets into a confined flow; investigation of in-line, staggered, and dissimilar hole configurations; and development of empirical correlations for predicting temperature distributions for discrete slots and multiple rows of dilution holes. Author

N86-24939# Ohio State Univ., Columbus.
SEPARATED FLOWS Final Report, 1 Aug. 1975 - 31 Dec. 1982

Odus R. Burggraf 29 Jan. 1986 15 p refs
(Contract N00014-76-C-0333)
(AD-A163551; OSURF-760325/712792) Avail: NTIS HC A02/MF A01 CSCL 20/4

This report contains a study of separation of three-dimensional steady flows and two-dimensional unsteady flows. During this reporting period, an analytical model of the laminar separation region in supersonic flow at high Reynolds number was formulated and shown to be in reasonable agreement with experimental results. The model gives scaling laws for the flow properties and length scales for the separation region. It was also shown that triple-deck theory is the valid limit for high Reynolds-number flows involving laminar separation and reattachment, on the basis of interacting boundary-layer theory. Another analysis demonstrated the nature of the flow near an abrupt change of surface height, such as steps and bases. Unsteady effects on three-dimensional boundary layers at large Reynolds number were analyzed and were found to fall into three distinct regimes of frequency parameter, based on triple-deck arguments. Algorithms were developed to treat separated flow problems, avoiding the difficulty of the separation singularity by use of time-marching in one case, and using a spectral method in the other case. Results have been obtained for both two and three-dimensional flows involving relatively large regions of separation. GRA

N86-24940# California Inst. of Tech., Pasadena.
STRUCTURE AND MIXING IN TURBULENT SHEAR FLOWS Final Report, 1 Mar. 1982 - 30 Jun. 1985
Anatol Roshko and Theodore VonKarman 30 Jun. 1985 8 p refs
(Contract N00014-76-C-0260)
(AD-A163584) Avail: NTIS HC A02/MF A01 CSCL 20/4

The research problems studied under this contract were the following: mixing in a forced plane shear layer; turbulent structure in two dimensional far wakes; effect of external excitation on separated flow; effect of curvature on free-shear-layer structure and mixing; structure and mixing in transverse jets. Significant results obtained are briefly summarized in the following Discussion. Complete descriptions of the research and of the results are contained in the references cited. GRA

N86-24941# Wisconsin Univ., Madison. Mathematics Research Center.
STATIONARY MOTIONS AND INCOMPRESSIBLE LIMIT FOR COMPRESSIBLE VISCOUS FLUIDS Technical Summary Report
H. B. DaVeiga Nov. 1985 27 p
(Contract DAAG29-80-C-0041)
(AD-A163600; MRC-TSR-2883) Avail: NTIS HC A03/MF A01 CSCL 20/4

This paper considers the non-linear system of partial differential equation, describing the barotropic stationary motion of a compressible fluid, in a bounded region Omega. Assume that the total mass of fluid inside Omega is fixed, and equal to (m) abs. vol. Omega, where the mean density m is given. For small f and g, there exists a unique solution u(x), rho(x) in a neighborhood of (0, m). Here, u(x) is the field of velocities, rho(x) the density of the fluid, p(rho(x)) the pressure field, and f(x) the external force field (in the physical interesting case one has g = 0). Moreover, the solutions of system converge to the solution of the Navier-Stokes equation as lambda approaches + infinity, i.e. when the Mach number becomes small. The solution of the Navier-Stokes equations are the incompressible limit of the solutions of the compressible Navier-Stokes equations. The proofs given here, apply, without supplementary difficulties, in the context of Sobolev spaces H superscript k,p, and other functional spaces. The results can be extended to the heat depending case, too. GRA

N86-24942# Wisconsin Univ., Madison. Mathematics Research Center.
L(2) STABILITY FOR WEAK SOLUTIONS OF THE NAVIER-STOKES EQUATIONS IN R(3) Technical Summary Report
Paolo Secchi Nov. 1985 12 p
(Contract DAAG29-80-C-0041)
(AD-A163612; MRC-TSR-2885) Avail: NTIS HC A02/MF A01 CSCL 20/4

We consider the motion of a viscous fluid filling the whole space R3, governed by the classical Navier-Stokes equations (1). Existence of global (in time) regular solutions for that system of non-linear partial differential equations is still an open problem. Up to now, the only available global existence theorem (other than for sufficiently small initial data) is that of weak (turbulent) solutions. From both the mathematical and the physical point of view, an interesting property is the stability of such weak solutions. We assume that v(t,x) is a solution, with initial datum vO(x). We suppose that the initial datum is perturbed and consider one weak solution u corresponding to the new initial velocity. Then we prove that, due to viscosity, the perturbed weak solution u approaches in a suitable norm the unperturbed one, as time goes to + infinity, without smallness assumptions on the initial perturbation. GRA

N86-24943# Wisconsin Univ., Madison. Mathematics Research Center.
ON K-BKZ AND OTHER VISCOELASTIC MODELS AS CONTINUUM GENERALIZATION OF THE CLASSICAL SPRING-DASHPOT MODELS Technical Summary Report
Amitabh Narain Dec. 1985 51 p refs
(Contract DAAG29-80-C-0041)
(AD-A163703; MRC-TSR-2895) Avail: NTIS HC A04/MF A01 CSCL 20/4

An alternate constitutive formulation for visco-elastic materials, with particular emphasis on macromolecular viscoelastic fluids, is presented by generalizing Maxwell's idealized separation of elastic and relaxation mechanisms. The notion of relative rate of change of elastic stress is identified, abstracted, and formulated with the help of the established theory of finitely elastic isotropic materials. This gives a local rate type constitutive relation for an elastic mechanism in a simple material. For the simplest class of viscoelastic polymer melts, the notion of rate of change of elastic stress and its damped accumulation is identified and formulated. Under conditions of moderate strain rates, this scheme implies the reliable K-BKZ model for a class of polymer melts. An obvious extension generalizes the remaining classical spring-dashpot models. GRA

N86-24944# Department of the Air Force, Washington, D.C.
DUAL MODE HEAT EXCHANGER Patent Application
Frank E. Altoz, inventor (to Air Force) Filed 3 Dec. 1985 18 p refs
(AD-D012156; US-Patent-Appl-SN-804193) Avail: NTIS HC A02/MF A01 CSCL 20/13

The invention comprises a compact, light weight, dual mode heat transfer device. The dual mode heat transfer device provides for air cooling of heat dissipating electronic components at moderate aircraft speeds and when available ambient air is below a preselected temperature. At elevated aircraft speeds when the ambient air temperature is above the preselected temperature a coolant liquid is converted to steam or vapor in order to cool the heat dissipating electronic components. A preferred embodiment of the invention includes a cold plate for conducting heat away from the heat dissipating components and radiator fins for dissipating cold plate heat to a air cooling flow. GRA

N86-24945# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN EXPERIMENTAL STUDY OF CLUSTERED NOZZLES WITH VARIABLE SHROUDS M.S. Thesis
James R. Moran Dec. 1985 82 p refs
(AD-A163961; AFIT/GAE/AA/85D-11) Avail: NTIS HC A05/MF A01 CSCL 20/4

The research of this thesis involved the investigation of pressure and flow fields in the base region of clustered nozzles during cold flow testing. Nozzle exit conditions simulating altitudes up to 75,000 feet and chamber-to-back pressure ratios up to 200 were used. The nozzle clusters considered were made up of sets of two and three dimensional supersonic convergent-divergent

nozzles with a square shroud around the cluster. The two dimensional nozzles had design exit Mach numbers of 3.68 and 2.94. The three dimensional nozzles had a design exit Mach number of 2.64. The nozzle clusters were studied using various configurations and with two shroud lengths. A schlieren system that allowed for both still photographs and motion pictures film was used to investigate the flow fields. The results of this study indicate that the pressure fields in the base region of a nozzle cluster are dependent on both geometry and on the operating altitude. The outer wall of the test section (shroud) adjacent to the nozzles was observed to significantly affect the flow patterns and measured pressures. Potential influences in performance exist due both to changes in the gas dynamics of the flow and the appearance of additional pressure-area forces. GRA

N86-24946# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

EFFECTS OF SURFACE ROUGHNESS ON PRESSURE DISTRIBUTION AND BOUNDARY LAYER OVER COMPRESSOR BLADES AT HIGH REYNOLDS NUMBER IN A TWO–DIMENSIONAL CASCADE M.S. Thesis

Larry D. Williams Dec. 1985 87 p refs
(AD-A163974; AFIT/GAE/AA/85D-17) Avail: NTIS HC A05/MF A01 CSCL 20/4

In this evaluation of the effects of surface roughness on the pressure distribution and boundary layer over compressor blades, the cascade consisted of seven NACA 65-A506 airfoils with a two inch chord and an aspect ratio of one. The blades were set in the test section at an angle of attack of 15 deg. The test section unit Reynolds number for the evaluation was in excess of two million/foot. Changes to the cascade blade pressure distribution were minimal for moderate average roughness (Ra=24.8 microns) to low average roughness values (Ra=.18 micron), except for pressures near the leading edge which were more pronounced. The pressures near the leading edge which were more prounced. The pressure distribution for a blade surface roughness of 53.8 microns differed considerably from the baseline case. The cascade test blade experienced laminar flow separation with turbulent reattachment at moderate to low roughness levels, and fully turbulent flow at high roughness levels. The blade suction surface boundary layer thickness increased with roughness values but was most responsive to the transition from laminar to turbulent flow. GRA

N86-24947# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

FLAT PLATE AND TURBINE VANE CASCADE HEAT TRANSFER INVESTIGATION USING A SHOCK TUBE M.S. Thesis

Patrick K. Fillingim Dec. 1985 89 p refs
(AD-A163992; AFIT/GAE/AA/85D-7) Avail: NTIS HC A05/MF A01 CSCL 20/4

A shock tube was used to initiate boundary layer growth on a splitter plate at zero incidence. The heat transfer rate determined from a thin film semiconductor gage was compared to theoretical values for the flat plate heat transfer problem. Correlation between theoretical laminar and turbulent boundary layer equations and the experimental data for various shock Mach number flows showed excellent agreement. The shock tube was also used to generate high temperature gas flows which were allowed to pass through a turbine vane cascade. Thin film semiconductor and resistance gages provides temperature histories at four locations along the suction side of a turbine vane over a range of shock strengths. Heat transfer rates were determined from these temperature histories using a finite differencing scheme to approximate the energy equation for a semi-infinite solid. The rate of heat transfer along the suction side of the vane was shown to decrease with chordwise position from the stagnation point at the leading edge to the half chord position. At the three quarter chord position heat transfer rates were higher than the preceding chord points. GRA

N86-24948# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

ADAPTIVE-GRID OPTIMIZATION FOR MINIMIZING STEADY-STATE, TRUNCATION ERROR M.S. Thesis

Donald E. Coffey, Jr. Dec. 1985 154 p refs
(AD-A164038; AFIT/GA/AA/85D-4) Avail: NTIS HC A08/MF A01 CSCL 20/4

This thesis develops an adaptive grid method which minimizes the truncation error in the finite difference solution. The study solves compressible, steady state, boundary layer equations assuming perfect gas flow over an isothermal wall. The Dorodnitsyn, compressibility transformation changes the boundary layer equations, as expressed in two dimensional, cartesian coordinates, into an incompressible form. The equations are then transformed into variables of a computational plane. Implicit Successive Over Relaxation (SOR) solves the finite differenced, computational, boundary layer equations. Comparison of the computed solution for incompressible flow over a flat plate to Blasius' exact solution shows the boundary layer code is accurate. The adaptive grid method uses Powell's method to optimize the solution grid by minimizing the sum of the third derivative in the computational plane of the tangential velocity component. This study tests the sum of the squares of the first, second, and third derivative of the tangential velocity as minimized functions. The accuracy of the optimized, adaptive grid solution is greater than the original, fixed grid solution. The study then applies the optimization to supersonic and hypersonic problems. The computed, adaptive grid solutions show good correlation with theoretical models for supersonic and hypersonic flow developed by Van Driest and Eckert. GRA

N86-24949# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A SCHLIEREN AND HOT-WIRE INVESTIGATION OF KARMAN VORTEX STREETS M.S. Thesis

John B. Wissler 13 Dec. 1985 135 p refs
(AD-A164101; AFIT/GAE/AA/85D-18) Avail: NTIS HC A07/MF A01 CSCL 20/4

This thesis involved taking schlieren and hot-film anemometer data on Karman vortex streets, then developing a means of characterizing the individual vortices in a street using a schlieren picture and the corresponding anemometer trace. A Thermo-Systems, Inc. IFA-100 anemometer system, with a Tektronix 425 oscilloscope, was used to record an anemometer trace. The trace was captured on photographic film. The oscilloscope also fired a Cordin Model 5401 spark lamp, which provided, via a schlieren optical system, a physical picture of the Karman streets formed behind a 5/16-inch dia cylinder in a 2-inch by 2-inch square cross-section test region with a Mach 0.43 flow. Distance and angle information were obtained from the schlieren photographs, and timing and anemometer output voltage were obtained from the anemometer trace photograph using an HP-9874A digitizer. The data were analyzed using a Newton-Raphson method to solve for two constants, which should have completely characterized the vortices in the vortex street, assuming the vortices followed the theoretical equation for a combined free and forced vortex. It was assumed that the superposition of two vortices plus the mean flow were the parameters influencing the flow at any point in space and time. GRA

N86-24950# Naval Postgraduate School, Monterey, Calif.

EXPERIMENTAL INVESTIGATION OF TURBULENT HEAT TRANSFER IN STRAIGHT AND CURVED RECTANGULAR DUCTS M.S. Thesis

George G. Galyo Dec. 1985 110 p refs
(AD-A164142) Avail: NTIS HC A06/MF A01 CSCL 20/13

An experimental apparatus has been constructed and tested to examine the convective heat transfer in straight and curved ducts of rectangular cross-section. The channel can be configured with both walls independently heated at a constant heat flux, or one wall at a constant heat flux and the opposite wall adiabatic. Local and average Nusselt numbers can be calculated and used to evaluate the effect of curvature on heat transfer. Experiments were conducted at steady state of turbulent flow with one wall heated at a constant flux and the opposite wall adiabatic. The heat transfer characteristics of the straight and curved sections,

on both the inner and outer walls, were compared. The heat transfer rate of the concave curved wall proved to be enhanced over both the convex curved wall and both straight sections. GRA

N86-24951# Ballistic Research Labs., Aberdeen Proving Ground, Md.
NUMERICAL FLOW FIELD CALCULATIONS FOR A MISSILE CONFIGURATION AT M = .6 Final Report
Jubaraj Sahu and Charles J. Nietubicz Jan. 1986 48 p refs Supersedes BRL-IMR-831 dated Dec. 1984
(AD-A164155; BRL-MR-3491; BRL-IMR-831) Avail: NTIS HC A03/MF A01 CSCL 20/4

Large separated flow region can seriously degrade the effectiveness of fins or any other control surface located in that region. A knowledge of the expected flow field can thus be very important in the initial design phase of a missile or projectile. The Aerodynamics Technology Branch of the US Army Missile Laboratory has requested numerical flow field data for a new missile design. Numerical computations have been made for the requested missile configuration at M = 0.6 and the results of these computations are presented in this report. A thin-layer Navier-Stokes base flow code has been used to compute the flow field for a full missile configuration including the base region. Numerical calculations have been made for both laminar and turbulent flow conditions. Details of the computed flow field are presented in the form of plots showing surface pressure distribution, velocity vectors, stream function and Mach number contours, particle paths and boundary layer parameters. Author (GRA)

N86-24952# General Electric Co., Pittsfield, Mass. Ordnance Systems Div.
TECHNICAL NOTES ON ORIFICE TESTS Final Report
Mel J. Bulman and John Mandzy Jan. 1986 72 p refs
(Contract DAAK11-78-C-0054)
(AD-A164227; BRL-CR-548) Avail: NTIS HC A04/MF A01 CSCL 20/4

The purpose of this task was to study the high speed flow of monopropellant through orifices in order to develop criteria for safe and efficient designs. Flow tests were conducted in a clear plastic, low pressure fixture and firing tests in a specially designed steel fixture. The initial injector studied was known to behave poorly in regenerative gun fixture firings. The flow tests revealed that it was subject to flow separation. The steel fixture tests with this injector exhibited strong evidence for flameholding inside the injector. Steel fixture firing tests were also performed on straight-through hole injectors. These showed evidence of flameholding in the orifice. The basic goal of this effort was not met. It is believed that neither the basic designs of the steel test fixture nor the instrumentation used were adequate for this task. Although no quantitative data was generated, a number of useful qualitative design guidelines were obtained. GRA

N86-24953# Los Alamos National Lab., N. Mex.
VORTICITY PRODUCTION IN DELAYED ASYMMETRIC CYLINDRICAL IMPLOSIONS
R. C. Mjolsness Oct. 1985 8 p
(Contract W-7405-eng-36)
(DE86-004369; LA-10564-MS) Avail: NTIS HC A02/MF A01

A model for vorticity production via asymmetric implosions is considered and it is seen that this mechanism may possibly account for macroscopic inward jetting of shocked material along one direction of the asymmetry midplane. However, any such conclusion is extremely model-dependent; specifically, it depends on the azimuthal interactions among unevenly shocked fluid elements, which are not adequately treated in the present analytical model. The direct numerical evaluation of the analytical model suggests that the effect may be marginal. DOE

N86-24954# Los Alamos National Lab., N. Mex.
VAPOR PHASE HEAT TRANSPORT SYSTEMS
J. C. Hedstrom and D. A. Neeper Sep. 1985 65 p
(Contract W-7405-eng-36)
(DE86-004360; LA-10487-MS) Avail: NTIS HC A04/MF A01

Progress in theoretical and experimental investigations of various forms of a vapor transport system for solar space heating is described, which could also be applied to service water heating. The refrigerant is evaporated in a solar collector, which may be located on the external wall or roof of a building. The vapor is condensed in a passively discharged thermal storage unit located within the building. The condensed liquid can be returned to the collector either by a motor-driven pump or by a completely passive self-pumping mechanism in which the vapor pressure lifts the liquid from the condenser to the collector. The theoretical investigation analyzes this self-pumping scheme. Experiments in solar test cells compared the operation of both passive and active forms of the vapor system with the operation of a passive water wall. The vapor system operates as expected, with potential advantages over other passive systems in design flexibility and energy yield. DOE

N86-24955*# Kansas Univ. Center for Research, Inc., Lawrence.
REVIEW AND EVALUATION OF RECENT DEVELOPMENTS IN MELIC INLET DYNAMIC FLOW DISTORTION PREDICTION AND COMPUTER PROGRAM DOCUMENTATION AND USER'S MANUAL ESTIMATING MAXIMUM INSTANTANEOUS INLET FLOW DISTORTION FROM STEADY-STATE TOTAL PRESSURE MEASUREMENTS WITH FULL, LIMITED, OR NO DYNAMIC DATA Final Report
William G. Schweikhard and Stephen R. Dennon Apr. 1986 257 p refs
(Grant NAG3-11)
(NASA-CR-176765; NAS 1.26:176765) Avail: NTIS HC A12/MF A01 CSCL 20D

A review of the Melick method of inlet flow dynamic distortion prediction by statistical means is provided. These developments include the general Melick approach with full dynamic measurements, a limited dynamic measurement approach, and a turbulence modelling approach which requires no dynamic rms pressure fluctuation measurements. These modifications are evaluated by comparing predicted and measured peak instantaneous distortion levels from provisional inlet data sets. A nonlinear mean-line following vortex model is proposed and evaluated as a potential criterion for improving the peak instantaneous distortion map generated from the conventional linear vortex of the Melick method. The model is simplified to a series of linear vortex segments which lay along the mean line. Maps generated with this new approach are compared with conventionally generated maps, as well as measured peak instantaneous maps. Inlet data sets include subsonic, transonic, and supersonic inlets under various flight conditions. Author

N86-24956 Houston Univ., Tex.
STUDIES OF VERTICAL ANNULAR GAS-LIQUID FLOWS Ph.D. Thesis
George J. Zabaras 1985 364 p
Avail: Univ. Microfilms Order No. DA8528720

Three types of vertical flowing films were studied. These are the free falling film, the falling film in the presence of countercurrent gas flow and the upward moving film due to concurrent flow of gas. An experimental program was performed based on a new electrochemical method for the dynamic measurement of the magnitude and the direction of the wall shear stress, and on a conductance wire probe for the simultaneous measurement of the film thickness. The data obtained for the free falling film reveal a strong length effect on the wavy film structure. Analysis of the data taken with countercurrent flow of gas shows that even at the flooding condition, the film flow is controlled by downward wave motion. Analyses of upward film flow data in a variety of ways suggest that at low gas rates the motion of the interface is controlled by a process of switching between steady states of the system. Dissert. Abstr.

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation,* and *19 Spacecraft Instrumentation.*

N86-24957*# United Technologies Research Center, East Hartford, Conn.
INVESTIGATION OF BREADBOARD TEMPERATURE PROFILING SYSTEM FOR SSME FUEL PREBURNER DIAGNOSTICS Final Technical Report, Oct. 1983 - May 1985
John Allen Shirley Jan. 1986 44 p refs
(Contract NAS8-34655)
(NASA-CR-178799; NAS 1.26:178799; R85-956642) Avail: NTIS HC A03/MF A01 CSCL 14B

The feasibility of measuring temperatures in the space shuttle main engine (SSME) fuel preburner using spontaneous Raman scattering from molecular hydrogen was studied. Laser radiation is transmitted to the preburner through a multimode optical fiber. Backscattered Raman-shifted light is collected and focused into a second fiber which connects to a remote-located spectrograph and a mutlichannel optical detector. Optics collimate and focus laser light from the transmitter fiber defining the probe volume. The high pressure, high temperature preburner environment was simulated by a heated pressure cell. Temperatures determined by the distribution of Q-branch co-vibrational transitions demonstrate precision and accuracy of 3%. It is indicated heat preburner temperatures can be determined with 5% accuracy with spatial resolution less than 1 cm and temporal resolution of 10 millisec at the nominal preburner operation conditions. E.A.K.

N86-24958*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
BEAM-MODULATION METHODS IN QUANTITATIVE AND FLOW VISUALIZATION HOLOGRAPHIC INTERFEROMETRY
Arthur Decker 1986 21 p refs Presented at Advanced Instrumentation for Engine Components, Philadelphia, Pa., 19-23 May 1986; sponsored by AGARD
(NASA-TM-87306; E-3029; NAS 1.15:87306) Avail: NTIS HC A02/MF A01 CSCL 14E

This report discusses heterodyne holographic interferometry and time-average holography with a frequency shifted reference beam. Both methods will be used for the measurement and visualization of internal transonic flows, where the target facility is a flutter cascade. The background and experimental requirements for both methods are reviewed. Measurements using heterodyne holographic interferometry are presented. The performance of the laser required for time-average holography of time-varying transonic flows is discussed. Author

N86-24959*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
APPARATUS FOR ELECTRICAL MEASUREMENTS OF THIN FILMS FROM 77 TO 1000 K
Lawrence G. Matus and Robert L. Summers Mar. 1986 7 p refs
(NASA-TM-87256; E-2839-1; NAS 1.15:87256) Avail: NTIS HC A02/MF A01 CSCL 14B

A novel method of mounting thin samples for electrical measurements is described. A vacuum chuck holds a mounting plate, which, in turn, holds the sample. Contacts on the mounting plate establish electrical connection to the sample. The attachment of wires directly to the samples is unnecessary. Measurements can be made at temperatures from 77 to 1000 K. As an application of the apparatus, resistivity and Hall measurements of a thin silicon carbide sample are presented. Author

N86-24960*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
INDUCTIVE ENERGY FOR RAPID STRAIN GUAGE ATTACHMENT Patent Application
Timothy D. Schott, inventor (to NASA), Robert L. Fox, inventor (to NASA), and John D. Buckley, inventor (to NASA) Filed 20 Feb. 1986 11 p
(NASA-Case-LAR-13237-1; NAS 1.71-LAR-13237-1; US-Patent-Appl-SN-831372) Avail: NTIS HC A02/MF A01 CSCL 14B

A new method of bonding strain gauges to base structures was found. Induction heating is used to concentrate high temperature levels in the bonding of a strain gauge to a substrate. By using new method embodiments, the adhesive curing schedules of the prior art were reduced from a matter of hours to a matter of minutes. A method is provided for installing a strain gauge device on a base. According to another aspect of the present method invention, the layer of ferric material is a thin plate of ferric material which is placed substantially adjacent to the upper surface of the strain gauge device prior to the heating of the layer of ferric material by induction heating. By utilizing the separate plate of ferric material, the present invention may be utilized to bond strain gauges to low reluctance bases such as aluminum or to no reluctance bases such as fiberglass. Author

N86-24961*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CHARACTERIZATION OF SIMULATED SMALL-DROPLET FUEL SPRAYS
Robert D. Ingebo 1986 10 p refs Proposed for presentation at the 22nd Joint Propulsion Conference, Huntsville, Ala., 16-19 Jun. 1986; sponsored by the AIAA, ASME, SAE and ASEE
(NASA-TM-87286; E-2987; NAS 1.15:87286) Avail: NTIS HC A02/MF A01 CSCL 14B

A two-fluid pneumatic atomizer operating at relatively high liquid and gas pressures produced water sprays that simulated small-droplet clouds of liquid fuel for use in studying vaporization and fuel-air mixing effects on combustor performance and emissions. To characterize the sprays, a scattered-light scanning instrument was developed and measurements of volume median or volume mean diameter, D sub V.5, were correlated with D sub O, W sub w, and W sub n, i.e., orifice diameter, water, and nitrogen gas flow rates, respectively, to give the general expression: D sub v.5 approx. (D sub o sup 0.2) (W sub w sup m) (W sub n sup n), which yields D sub v.5 = 45 (D sub o sup 0.2) (W sub w sup 0.2) (W sub w sup - 1.2). Values of D sub o, W sub w, and W sub n are in centimeters and grams/second, respectively. Farther downstream at an axial distance of 6.7 cm, exponent m increased from 0.2 to 0.4 and exponent n decreased from -1.2 to -1.0 and at a distance of 25 cm downstream of the atomizer, n decreased to -0.8. The increase in exponent m and decrease in exponent n was attributed to a loss of very small droplets from the spray due primarily to vaporization and diffusion effects on clouds of small droplets traveling a distance of 25 cm. Author

N86-24962*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MEASUREMENT OF VISCOSITY OF GASEOUS MIXTURES AT ATMOSPHERIC PRESSURE
Jag J. Singh, Gerald H. Mall (Computer Sciences Corp., Hampton, Va), and Hoshang Chegini (Old Dominion Univ.) May 1986 19 p refs
(NASA-TP-2582; L-16103; NAS 1.60:2582) Avail: NTIS HC A02/MF A01 CSCL 14B

Coefficients of viscosity of various types of gas mixtures, including simulated natural-gas samples, have been measured at atmospheric pressure and room temperature using a modified capillary tube method. Pressure drops across the straight capillary tube section of a thermal mass flowmeter were measured for small, well-defined, volume flow rates for the test gases and for standard air. In this configuration, the flowmeter provides the volumetric flow rates as well as a well-characterized capillary section for differential pressure measurements across it. The

coefficients of viscosity of the test gases were calculated using the reported value of 185.6 micro P for the viscosity of air. The coefficients of viscosity for the test mixtures were also calculated using Wilke's approximation of the Chapman-Enskog (C-E) theory. The experimental and calculated values for binary mixtures are in agreement within the reported accuracy of Wilke's approximation of the C-E theory. However, the agreement for multicomponent mixtures is less satisfactory, possible because of the limitations of Wilkes's approximation of the classical dilute-gas state model. Author

N86-24963*# University of Southern Mississippi, Hattiesburg. Dept. of Physics and Astronomy.
SET-UP AND DEMONSTRATION OF A LOW ENERGY ELECTRON MAGNETOMETER (LEEM)
Grayson H. Rayborn May 1986 46 p refs
(Contract NAS1-17435)
(NASA-CR-178091; NAS 1.26:178091) Avail: NTIS HC A03/MF A01 CSCL 14B

Described are the design, construction and test results of a Low Energy Electron Magnetometer (LEEM). The electron source is a commercial electron gun capable of providing several microamperes of electron beam. These electrons, after acceleration through a selected potential difference of 100-300 volts, are sent through two 30 degree second-order focussing parallel plate electrostatic analyzers. The first analyzer acts as a monochromator located in the field-free space. It is capable of providing energy resolution of better than 10 to the -3 power. The second analyzer, located in the test field region, acts as the detector for electrons deflected by the test field. The entire magnetometer system is expected to have a resolution of 1 part in 1000 or better. Author

N86-24964*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
RAMP-INTEGRATION TECHNIQUE FOR CAPACITANCE-TYPE BLADE-TIP CLEARANCE MEASUREMENT
Garimella R. Sarma and John P. Barranger 1986 13 p refs Presented at the Aerospace Industries/Test Measurement Symposium, Seattle, Wash., 5-8 May 1986; sponsored by Instrument Society of America
(NASA-TM-87241; E-2916; NAS 1.15:87241) Avail: NTIS HC A02/MF A01 CSCL 14B

The analysis of a proposed new technique for capacitance type blade tip clearance measurement is presented. The capacitance between the blade tip and a mounted capacitance electrode within a guard ring forms one of the feedback elements of a high speed operational amplifier. The differential equation governing the operational amplifier circuit is formulated and solved for two types of inputs to the amplifier - a constant voltage and a ramp. The resultant solutions shows an output that contains a term that is proportional to the derivative of the product of the input voltage and the time constant of the feedback network. The blade tip clearance capacitance is obtained by subtracting the output of a balancing reference channel followed by integration. The proposed sampled data algorithm corrects the environmental effects and varying rotor speeds on-line, making the system suitable for turbine instrumentation. System requirements, block diagrams, and typical application are included. Author

N86-24965# Stanford Univ., Calif. Center for Space Science and Astrophysics.
THE DEVELOPMENT AND TEST OF A PULSE-COUNTING IMAGING DETECTOR SYSTEM FOR SOLAR SYSTEM STUDIES AT ULTRAVIOLET AND VISIBLE WAVELENGTHS Final Report
J. G. Timothy May 1986 7 p
(Grant NAGw-627)
(NASA-CR-176671; NAS 1.26:176671) Avail: NTIS HC A02/MF A01 CSCL 14B

The goal of this program is the development of light-weight, pulse-counting imaging detector tubes for solar system missions. The Multi-anode Microchannel Array (MAMA), have demonstrated the best combination of spatial resolution and dynamic range of any pulse-counting detector system available to date. Under this grant, compact sealed MAMA detector tubes compatible with the weight and volume limitations of deep space missions were fabricated for the first time. The principal task of the development program to date has been the definition of the appropriate processes for conditioning the high-gain, curved-channel microchannel plate (MCP) by means of bake and scrub procedures. The curved-channel MCPs currently available are fabricated from Corning 8161 glass or equivalent, and a bake at temperatures in excess of 300 C for a period well in excess of 48 hours is required to completely desorb the internal surface area and arrive at a pressure asymptote. Following this, a scrub by stimulating the MCP with either 600 eV electrons or with UV radiation from a mercury penray lamp is required to further clean up the internal surfaces and to reach a stable gain plateau. After conditioning, a stable response to an accumulated signal level of greater than 2.5 x 10 to the 11th power counts sq/mm has far been demonstrated. Author

N86-24966*# Dayton Univ., Ohio. Impact Physics Lab.
HALL STATION AND CAMERA SYSTEM OPERATION AND MAINTENANCE MANUAL
Andrew J. Piekutowski and Edward A. Strader Apr. 1986 22 p
(Contract NAS8-36646)
(NASA-CR-178836; NAS 1.26:178836; UDR-TM-86-03) Avail: NTIS HC A02/MF A01 CSCL 14B

The major components of the Hall station and camera system are described. The Hall film record of an event provides the time of flight of the projectile between the slits. A time mark generator is used to supply extremely short pulses of light at a known frequency. These pulses of light are used to produce timing marks on the edge of the film. Comparison of these marks with the spacing of the projectile images provides the information necessary to determine the time of flight of the projectile. Since the slits are installed with a known separation distance, calculation of the velocity of any object passing both slits is a simple matter. B.G.

N86-24967*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMBINED FRINGE AND FABRY-PEROT LASER ANEMOMETER FOR THREE COMPONENT VELOCITY MEASUREMENTS IN TURBINE STATOR CASCADE FACILITY
Richard G. Seasholtz and Louis J. Goldman 1986 23 p refs Presented at the 67th Symposium of the AGARD Propulsion and Energetics Panel on Advanced Instrumentation for Aero Engine Components, 19-23 May 1986, Philadelphia, Pa.
(NASA-TM-87322; E-3058; NAS 1.15:87322) Avail: NTIS HC A02/MF A01 CSCL 14B

A laser anemometer is described that was developed for use in a 508 mm diameter annular turbine stator cascade facility. All three velocity components are measured through a single restricted optical port, both within the stator vane row and downstream of the vanes. The measurements are made through a cylindrical window in the casing that matches the tip radius of the cascade. The stator tested has a contoured hub endwall that results in a large radial flow near the hub. The anemometer uses a standard fringe configuration (LFA) with a fluorescent aerosol seed to measure the axial and circumferential velocity components. The radial component is measured with a confocal Fabry-Perot interferometer. The two configurations are combined in a single optical system and can operate simultaneously. Data are presented to illustrate the capabilities of the system. Author

N86-24968# Air Force Weapons Lab., Kirtland AFB, N. Mex.
AN ULTRAVIOLET LASER SHADOWGRAPHY SYSTEM FOR THE SHIVA-STAR FAST CAPACITOR BANK Final Report, 5 Nov. 1984 - 30 Jun. 1985
Carl Enhole Nov. 1985 23 p refs
(AD-A163867; AFWL-TR-85-82) Avail: NTIS HC A02/MF A01 CSCL 14/5

An ultraviolet laser shadowgraphy has been developed which is sensitive to plasma densities in the few 10 to the 16th power/cu cm regime. It is fast enough (< 10 ns exposure time) to freeze

the motion of even fast-moving plasmas, and it is capable of operating in an environment where there is a high level of both background light and electrical noise. System setup and adjustments as well as interpretation of data from a coaxial-geometry experiment are discussed. GRA

N86-24969# Department of the Air Force, Washington, D.C.
TOTAL TEMPERATURE PROBE BUFFER AMPLIFIER Patent
William E. Ott, inventor (to Air Force) Issued 8 Oct. 1985 5 p
(AD-D011967; US-Patent-4,546,320; US-Patent-Appl-SN-580979; US-Patent Class-328-3) Avail: US Patent and Trademark Office
CSCL 14/2

Discussed is the elimination of undesirable thermally induced changes of electrical characteristics of signal components accomplished by three operational amplifiers, which provide electrical power to a system critical component and produces a reference output signal composed of the desirable function produced by the system critical components plus the undesirable thermally induced signal components produced by the changes of the electrical characteristics of two identical lead wires connected to the system critical component. The second operational amplifier circuit senses the voltage drop in one of the two identical lead wires attached to the critical component. The second operation amplifier produces a sensing output signal that changes in value with the undesirable thermally induced changes of the electrical characteristics of one of the lead wires. Since the two lead wires are identical in resistance characteristics the sensing output signal varies proportionately with the total undesirable electrical signal components encountered. The third operational amplifier circuit is a subtraction circuit producing a system output signal proportionate with the difference between the reference output signal and the sensing output signal. The result is a system output signal with all undesirable thermally induced signal components eliminated. GRA

N86-24970# Naval Research Lab., Washington, D. C.
A GATED MICROCHANNEL PLATE IMAGE INTENSIFIER PACKAGED IN A REFLEX CAMERA BACK Interim Report
S. Hauver, R. E. Pechacek, J. R. Grieg, D. P. Murphy, and M. Raleigh 19 Dec. 1985 22 p
(AD-A163015; NRL-MR-5702) Avail: NTIS HC A02/MF A01
CSCL 14/5

A fast (exposure down to approx. 10 ns) electrically triggered camera back/shutter designed for use with the Hasselblad 500C still camera is described. This camera back contains a microchannel plate image intensifier which can be gated and provides a gain of approximately X1000. It reads out on to Polaroid film through a fiber optic face plate. The gated camera back is interchangeable with the regular Polariod back (or any other) for the Hasselbald 500C and maintains the through the lens focussing. GRA

N86-24971# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DESIGN OF A DIGITAL CONTROLLER FOR AN ULTRAGRAVIMETRIC MICROBALANCE M.S. Thesis
Christopher J. Bolan Dec. 1985 117 p refs
(AD-A164014; AFIT/GE/ENG/85D-4) Avail: NTIS
HC A06/MF A01 CSCL 14/2

The design and construction of a digital control system for an Ultragravimetric pivotal beam microbalance has been performed. The digital system replaces the present analog control circuitry of the microbalance. Included in the design is a hardware circuit, a Z-151 computer which has been interfaced to the circuit, and software to control the circuit and to operate the microbalance. An analysis of the present analog control circuit is first presented. This analysis gives the overall function of the circuit as well as an indepth view of the configuration of a particular operational amplifier: the derivative compensator. The hardware for the digital control system is described followed by the development of the software which controls the system. Studies performed on the experimental design revealed that the system satisfactorily simulates the analog control circuit. Tests show that the system automatically zeros the balance, weighs the sample, stores the data onto a disk file, and terminates the experiment. GRA

N86-24972# Naval Postgraduate School, Monterey, Calif.
RECIPROCITY CALIBRATION IN A PLANE WAVE RESONATOR Ph.D. Thesis
Charles L. Burmaster Dec. 1985 434 p refs
(AD-A164149; NPS61-86-006) Avail: NTIS HC A19/MF A01
CSCL 14/2

A non-standard method for the electroacoustic reciprocity calibration of a condenser microphone is theoretically developed and experimentally employed to calibrate a WE640AA laboratory standard microphone. The average experimental calibration so obtained was found to be in absolute agreement with a pressure coupler comparison calibration of the same microphone made at the National Bureau of Standards to within an experimental uncertainty (sigma) of 0.03 dB over the frequency range of 245 to 1470 Hz. using a 70 cm. plane wave resonant cavity, and to within an experimental uncertainty (sigma) of 0.06 dB over the frequency range of 735 to 1470 Hz. using a 23 cm. plane wave resonant cavity. Above 1470 Hz., the difference between the resonant plane wave reciprocity calibrations and the pressure coupler comparison calibration increased linearly with frequency to a maximum of 0.61 dB at 5145 Hz. GRA

N86-24973# Florida State Dept. of Transportation, Tallahassee. Bureau of Topography.
AERIAL CAMERA RESEARCH: ACCURACY COMPARISON USING THE ZEISS RMK 15/23 AND THE JENA LMK AERIAL CAMERAS
W. C. DeLoach, D. E. Merkel, W. C. Johnson, and E. S. Rhodes Apr. 1985 19 p Sponsored in part by the Federal Highway Administration, Tallahassee, Fla. Prepared in cooperation with Florida State Department of Transportation, Gainesville
(PB86-126836; FHWA/FL/BMR-85/291) Avail: NTIS
HC A02/MF A01 CSCL 14E

The primary purpose of the project was to provide an accuracy comparison between cross sections produced from photography flown simultaneously with each of the cameras, the JENA LMK and the ZEISS RMK 15/23. An additional goal was to provide a comparison of color infrared photography produced using the JENA LMK with color infrared photography produced using the ZEISS camera. GRA

N86-24974# Interior Dept., Washington, D.C.
IMPROVED DETECTOR FOR THE MEASUREMENT OF GAMMA RADIATION Patent Application
F. B. Zelt, inventor (to Interior Dept. Filed 25 Jul. 1985 12 p
(PB86-106945; US-Patent-Appl-SN-758899) Avail: NTIS
HC A02/MF A01 CSCL 18D

The present invention lies in the field of gamma ray spectrometry of geologic deposits and other materials, such as building materials (cement, asphalt, etc.) More specifically, the invention is an improved device for the gamma ray spetcrometery of gelogical deposits as a tool for petroleum exploration, geologic research and monitoring of radio-active materials such as in uranium mill tailings and the like. Improvement consists in enlarging the area of the receptor face and without any necessarily substantial increase in the volume of the receptor crystal over the current cylindrical shapes. The invention also provides, as a corollary of the increase in area receptor crystal face, a reduction in the weight of the amount of material necessary to provide effective shielding of the crystal from atmospheric radiation and radiation from deposits not under examination. The area of the receptor crystal face is increased by forming the crystal as a truncated cone with the shielding shaped as a hollow frustrum of a cone. A photomultiplier device is secured to the smaller face of the crystal. The improved detector shape can also be used in scintillometers which measure total gamma radiation. GRA

N86-24975# National Bureau of Standards, Boulder, Colo. Electromagnetic Technology Div.
METROLOGY FOR ELECTROMAGNETIC TECHNOLOGY: A BIBLIOGRAPHY OF NBS (NATIONAL BUREAU OF STANDARDS) PUBLICATIONS
K. E. Kline and M. E. DeWeese Jul. 1985 70 p

(PB86-130234; NBSIR-85/3029) Avail: NTIS HC A04/MF A01 CSCL 14B

The bibliography lists the publications of the personnel of the Electromagnetic Technology Division of NBS in the period from January 1970 through December 1984. A few earlier references that are directly related to the present work of the Division are included. GRA

36 LASERS AND MASERS

Includes parametric amplifiers.

N86-24976 British Broadcasting Corp., Kingswood (England). Engineering Div.

EXPERIMENTS WITH DIGITALLY MASTERED LASERVISION OPTICAL DISCS

M. A. Parker Mar. 1986 18 p refs

(BBC-RD-1986/1) Copyright. Avail: BBC, Kingswood Warren, Tadworth, Surrey, Engl.

Experimental tests in which digital data was mastered onto a LaserVision disc to examine its potential as a source for a new BBC 1 channel logo are described. The logo had been electronically generated on a graphics computer and stored as digitally coded television frames. The tests involved mastering a disc with segments of a short video sequence derived from the data for the new logo, and with pseudo-random data. Conventional pressings from this digital master were then replayed on a domestic player. After minor modification to the replay signal path and to the control system of the player both signal types were successfully recovered and various performance characteristics of the system were measured. From the test it was estimated that replay data rates up to 50 Mbit/s could be achieved and that errors in the replayed data could be corrected with an overhead of about 7%. Although the replay data rates were satisfactory, the current degree of mechanical reliability of the domestic player makes the system unsuitable as a source for animated television logos. Author

N86-24977*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.

LASER RANGING AND VIDEO DISPLAY SYSTEM Patent Application

Jim Kevin Russell, inventor to (NASA) (Lockheed Engineering and Management Services Co., Inc., Houston, Tex.) Filed 18 Mar. 1986 23 p

(NASA-Case-MSC-20870-1; NAS 1.71:MSC-20870-1; US-Patent-Appl-SN-840825) Avail: NTIS HC A02/MF A01 CSCL 17I

Ranging data and video display systems, and, more particularly, methods and apparatus for generating measurements of range and range rate and display in conjunction with video imagery are developed. Method and apparatus are disclosed for deriving laser ranging information and generating a video display combining an image of the target with alpha-numeric indications of the ranging information. A television camera and laser ranger are boresighted parallel to one another and aimed at a remote target object. An infrared laser diode in the ranger is pulsed. Corresponding light pulses reflected from the target are detected by the ranger. Elapsed time between transmission of each of a plurality of such pulses and receipt by the ranger is measured and an average time derived. Processor circuitry derives ranges and range rate of the target from the time average, generates alpha-numeric indications, and superimposes them with target video images generated by the television camera on a television monitor. Author

N86-24978*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

DUAL MODE LASER VELOCIMETER Patent Application

William D. Gunter, Jr., inventor (to NASA), Ralph W. Donaldson, inventor (to NASA), and Alma G. Anderson, Jr., inventor (to NASA) Filed 31 Mar. 1986 16 p

(NASA-Case-ARC-11634-1; NAS 1.71:ARC-11634-1; US-Patent-Appl-SN-846427) Avail: NTIS HC A02/MF A01 CSCL 20E

This invention relates to a laser Doppler velocimeter (LDV) that is capable of operating with a small focus diameter for analyzing fluid flows at low velocity with high spatial resolution, or with a larger focus diameter to measure fluid flows at higher velocities accurately. More particularly, it relates to such an LDV in which a simple reversal of a lens pair will allow the LDV to operate in the two focus diameter modes. M.G.

N86-24979# Aerospace Corp., El Segundo, Calif.

REVERSE-WAVE SUPPRESSOR MIRROR EFFECTS ON CW HF UNSTABLE RING LASER PERFORMANCE

Jay M. Bernard, Richard A. Chodzko, and Harold Mirels 30 Sep. 1985 34 p refs

(Contract F04701-83-C-0084)

(AD-A163529; TR-0084A(5764)-1; SD-TR-85-92) Avail: NTIS HC A03/MF A01 CSCL 20/5

The effect of a reverse-wave suppressor (RWS) mirror on the performance of a CW HF unstable ring laser has been measured in terms of forward/reverse-wave power ratio (R) and forward-wave beam quality. It was found that a well-aligned RWS mirror gave the best suppression R = approx. 100 and diffraction-limited beam quality. Resonator performance degraded rapidly with misalignment of the RWS mirror: a 200-microrad tilt reduced R to 2.5 and the beam quality by a factor of 2. The forward-wave near-field pattern showed distinct fringes as the RWS mirror was misaligned, suggesting that a higher-order mode was causing the beam quality to degrade. A novel technique was developed to reduce the alignment sensitivity of the RWS mirror. By use of a distorted relay mirror, an aberrated (approx. = 2 lambda) reverse wave was fed back into the ring. The aberrated reverse-wave feedback greatly reduced the sensitivity of resonator performance to RWS mirror tilt. Diffraction-limited beam quality and good suppression (R = approx. 20) was observed over a tilt range of 600 microrad. It is postulated that the aberrated RWS mirror provides sufficient feedback to suppress the reverse wave over a wide angular range, yet not enough to produce higher-order transverse modes in the forward wave. GRA

N86-24980# Naval Research Lab., Washington, D. C.

NONLINEAR ANALYSIS OF EFFICIENCY ENHANCEMENT IN UBITRON/FREE-ELECTRON LASER AMPLIFIERS Interim Report

H. P. Freund and A. K. Ganguly 21 Jan. 1986 31 p

(AD-A163619; NRL-MR-5703) Avail: NTIS HC A03/MF A01 CSCL 20/5

A technique for efficiency enhancement in Ubitron/Free-Electron Laser amplifiers is analyzed which makes use of both tapered wiggler and axial guide magnetic fields. A set of model equations is derived which describes the coupling between an ensemble of electrons and the radiation field. The analysis is fully three-dimensional, and treats the propagation of an electron beam of finite cross-sectional area through a loss-free cylindrical waveguide in the presence of a helically symmetric wiggler field and an axial guide magnetic field. The model equations are solved numerically, and substantial enhancements in the interaction efficiency are found for a variety of choices of the model parameters. The efficiency enhancement is observed to be a sensitive function of both the degree of taper in the wiggler and axial magnetic fields as well as the point at which the taper is begun. In order to illustrate the physical mechanism underlying the efficiency enhancement, a modified pendulum equation which describes the interaction is derived from the orbit equations under a set of idealized assumptions, and used to construct a small-signal theory of the efficiency enhancement. GRA

N86-24981# Illinois Univ., Urbana. Dept. of Electrical and Computer Engineering.

LASER PROBING AND MODIFICATION OF MOCVD AND VPE REACTOR KINETICS Final Report, 1 Jul. 1984 - 31 Dec. 1985

J. G. Eden Oct. 1985 12 p refs

(Grant DAAG29-84-G-0007)

(AD-A163860; ARO-21933.1-PH-RI) Avail: NTIS HC A02/MF A01 CSCL 20/5

Experiments are described in which the potential of dye vapor and HgBr as tunable visible lasers is under investigation. A near UV optically pumped HgBr laser has been demonstrated and transient excited-state absorption in HgBr has been observed. Intense stable discharges in POPOP and coumarin 6 vapor have been obtained and gain measurements are underway. GRA

N86-24982# Stanford Univ., Calif. Lab. of Physics.
STUDIES ON RADIATIVE COLLISIONAL AND ULTRAVIOLET LASERS Final Report, 1 Jan. 1983 - 31 Dec. 1985
S. E. Harris and J. F. Young Nov. 1985 24 p refs
(Contracts F49620-83-C-0016; MIPR-ARO-103-85)
(AD-A163901; ARO-20117.4-PH) Avail: NTIS HC A02/MF A01 CSCL 20/5

Significant accomplishments of this program include: the first microwave pumping of an excimer laser; the first use of pulsed hollow-cathode technology to produce substantial quantities of core-excited metastable atoms; the use of these metastable atoms to delineate a partial Grotrian diagram for core-excited Na; the proposal of the concept of quasi-metastable quartet levels and the experimental verification of their importance in the column I metals; and the proposal for short wavelength systems based on super Coster-Kronig transitions. GRA

N86-24983# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
OPTICAL FEEDBACK STABILIZATION OF LASER DIODES FOR PASSIVE RESONANCE RING LASER GYRO APPLICATIONS M.S. Thesis
Daniel J. Stech Dec. 1985 63 p refs
(AD-A163942; AFIT/GE/ENG/85D-44) Avail: NTIS HC A04/MF A01 CSCL 17/7

Reduced cost, greater reliability, and compatibility with integrated optics are some of the advantages gained by incorporating semiconductor lasers into the design of passive resonant ring laser gyroscopes (PRRLG). Unfortunately, the large spectral linewidth typical of semiconductor lasers greatly limits the sensitivity of such a configuration. This research details the modification of a laser diode to obtain a stable, single mode, narrow spectral output. Optical feedback configuration compatible with the input optics to a PRRLG was designed. Spectral narrowing and modal dynamics of the external coupled cavity laser were measured. By temperature stabilization and optical feedback a free running linewidth of 60 MHz was reduced to below 13 MHz and was maintained in a single mode for 20 minutes or more. GRA

N86-24984 Department of the Air Force, Washington, D.C.
LASER BEAM DUCT PRESSURE CONTROLLER SYSTEM Patent
Arnold J. Laderman, inventor (to Air Force) and Frederick M. Bergthold, Jr., inventor (to Air Force) 3 Sep. 1985 5 p
(AD-D012017; US-Patent-4,538,635; US-Patent-Appl-SN-539352; US-Patent Class-137-114) Avail: US Patent and Trademark Office CSCL 20/4

Disclosed is a laser beam duct pressure controller system for maintaining a spatially uniform pressure in a flowing gas volume which is subjected to temporal pressure variations. This desired result is accomplished with cooperating structural components (and gases therein), which eliminate the axial flow of a conditioning gas within the laser beam duct by matching the time rate of change of the pressure of the flowing conditioning gas to the time rate of change of the pressure in the cavity of an operably associated laser beam turret. GRA

N86-24985# Naval Research Lab., Washington, D. C.
THE AXIAL INJECTION TEM ORBITRON MASER
John M. Burke and Wallace M. Manheimer 31 Jan. 1986 58 p refs
(AD-A164166; AD-E750890; NRL-MR-5675) Avail: NTIS HC A04/MF A01 CSCL 20/5

The linear theory of the TEM orbitron maser models, the interaction of axially injected electrons orbiting the positively charged center conductor of a coaxial waveguide with the TEM waveguide mode, is discussed. The theory treats electrons with arbitrary values of angular momentum. The threshold values of the cavity Q multiplied by the electron beam power required for self-oscillation in a finite length oscillator configuration is presented as well as the spacial growth rate calculated for an infinite length TEM orbitron amplifier. The basic design equations for the axial injection scheme are developed. GRA

N86-24986# Naval Research Lab., Washington, D. C.
INDUCED RESONANCE ELECTRON CYCLOTRON (IREC) QUASI-OPTICAL MASER
P. Sprangle, Cha-Mei Tang, and P. Serafim 31 Jan. 1986 19 p refs
(AD-A164167; AD-E750890; NRL-MR-5678) Avail: NTIS HC A02/MF A01 CSCL 20/5

This paper analyzes an induced resonance electron cyclotron (IREC) quasioptical maser configuration. This configuration has the unique features of being highly efficient and at the same time relatively insensitive to the detrimental effects of poor beam quality. A system of nonlinear coupled orbit equations, describing the dynamics of electrons in a spatially varying external magnetic field and the electromagnetic field of a steady state oscillator, are derived and analyzed. We show that with the proper choice for the index of refraction, the high frequency cyclotron interaction can be made insensitive to a beam energy spread. The interaction can, however, be sensitive to the beam's pitch angle spread. The necessary conditions on beam quality for high efficiency operation are derived and shown to be in good agreement with out numerical solutions. Furthermore, we show that by appropriately tapering the magnetic field an induced resonance condition can be achieved which results in high interaction efficiencies. It is anticipated that an efficient, high power millimeter, submillimeter and infrared radiation source can be realized with the IREC quasioptical maser configuration. GRA

N86-24987 Rochester Univ., N. Y.
ANALYSIS OF THE GAIN-COUPLED DISTRIBUTED FEEDBACK LASER AS A SOURCE OF SHORT OPTICAL PULSES Ph.D. Thesis
Irl Noel Duling, III 1985 192 p
Avail: Univ. Microfilms Order No. DA8528543

The results of an investigation of the distributed feedback laser (DFL) as a source for short optical pulses is reported in this thesis. The DFL provides a uniquely simple and inexpensive alternative to synchronously pumped dye lasers. The fundamental difference is the use of a modulation of the refractive index of the gain medium to provide feedback instead of external cavity mirrors. This feedback method allows the laser to produce short pulses from a single pump pulse. The modulation also limits the bandwidth of the oscillation so that the pulses are constrained to be transform limited. To determine the optimal conditions for the production of short pulses a semiclassical rate equation model of the DFL was developed. The output duration of the laser pulse is shown to rely primarily on the cavity length and the pump pulse duration. A curve which combines these two dependences is presented which is capable of predicting the performance of any given DFL. The results of an investigation of the distributed feedback laser (DFL) as a source for short DFL was conducted. The output was observed on a picosecond synchronized stream camera. In addition a probe pulse was scattered from the transit feedback of the laser providing a direct measurement of the modulation present. In the course of this investigation a number of Nd:YAG laser systems were constructed and evaluated as pump sources for the DFL. One such system, the CW-pumped regenerative amplifier represents a significant technological advance over previous systems for providing high power, high repetition rate, stable pulses at 1.06 micron. The use of these systems as the pump for synchronous dye amplifier systems is also presented.
Dissert. Abstr.

N86-24988 Colorado Univ., Boulder.
MICROLENS SYSTEM FORMED ON THE END OF A SINGLE MODE FIBER FOR LASER APPLICATIONS Ph.D. Thesis
Kyung Shik Lee 1985 190 p
Avail: Univ. Microfilms Order DA8528502

In this thesis microlenses on the end of single mode fibers were designed, fabricated and tested. In designing this microlens-ended single mode fiber (MSMF) system for laser applications the focusing beam parameters such as minimum spot size W sub 02, minimum spot size position Z sub m, Rayleigh range Z sub R and maximum intensity position Z sub p are very important. These theories state that the focusing beam parameters depend on the lens system parameters and change due to the finite size of the incident beam, finite size of the lens aperture and aberrations. The various types of photoresist microlenses were fabricated on the ends of single mode optical fibers as well as multimode optical fibers using the photolithographic process. The thickness and the radius of curvature of microlenses developed depend on the total exposing energy in the photolithographic process. The developed microlenses were tested by measuring the focusing beam parameters and the intensity distribution near the waist position. Measured focusing beam parameters of microlenses closely follow those expected from the paraxial theory or from the diffraction theory. The shape of the lens also roughly matches the lens shape predicted under some assumptions. Both measured and expected values for (at 830 nm) WO2, Zm and Zr are 0.7 approximately 3.0 micron, 3.5 approximately 20 micron and 0.9 approximately 13 micron, respectively. Various testing apparatus for the spot size measurement, waist position measurement, examination of the intensity distributiona study of the lens surface were built. The minimum spot sizes and minimum spot size positions were measured using the interferometric knife-edge scanning system. The sizes of microlenses were determined by using the scanning electron microscope. Finally, tolerance criteria for the degree of aperturing and spherical aberration in MSMF systems (cutoff wavelength of optical fiber = 690 nm, wavelength of an incident beam = 830 nm) are a/W less than 0.95, a 2 less than 0.4 x 10-3 lambda. These tolerance criteria were obtained from the Modified Strehl intensity. Dissert. Abstr.

N86-24989 Arkansas Univ., Fayetteville.
CHAOS IN LASER-MATTER INTERACTIONS Ph.D. Thesis
Mei-Li Shih 1985 154 p
Avail: Univ. Microfilms Order No. DA8528947

There is much interest in deterministic chaos which can appear in nonlinear dynamical systems. Various nonlinear systems in quantum optics have been investigated and found to admit chaotic behavior with well-defined routes to chaos. For instance, the well-known Maxwell-Bloch equations for a Doppler-broadened, unidirectional ring laser have been found to have chaotic behavior for parameters in the region of the so-called Casperson instability. Numerical results are found to be in reasonable qualitative agreement with recent universal routes to chaos found experimentally are also found in the numerical computations performed during this research. A model of a coupled-mode homogeneously broadened laser has also been found to give rise to chaotic time evolution, and there is a period-doubling route to chaos as the degree of spatially nonuniform pumping is increased. A model of multi-photon excitation of molecules in infrared fields has also been studied following recent work by Ackerhalt, et al. The decay of a certain correlation function due to chaos is found to lead to fluence-dependent absorption. Dissert. Abstr.

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N86-24990*# Akron Univ., Ohio. Dept. of Mechanical Engineering.
SYSTEM LIFE AND RELIABILITY MODELING FOR HELICOPTER TRANSMISSIONS Final Report
M. Savage and C. K. Brikmanis Washington Apr. 1986 202 p refs
(Grant NAG3-55)
(NASA-CR-3967; E-2889; NAS 1.26:3967) Avail: NTIS HC A10/MF A01 CSCL 05C

A computer program which simulates life and reliability of helicopter transmissions is presented. The helicopter transmissions may be composed of spiral bevel gear units and planetary gear units - alone, in series or in parallel. The spiral bevel gear units may have either single or dual input pinions, which are identical. The planetary gear units may be stepped or unstepped and the number of planet gears carried by the planet arm may be varied. The reliability analysis used in the program is based on the Weibull distribution lives of the transmission components. The computer calculates the system lives and dynamic capacities of the transmission components and the transmission. The system life is defined as the life of the component or transmission at an output torque at which the probability of survival is 90 percent. The dynamic capacity of a component or transmission is defined as the output torque which can be applied for one million output shaft cycles for a probability of survival of 90 percent. A complete summary of the life and dynamic capacity results is produced by the program. Author

N86-24991*# Irwin (Arthur S.) Co., Inc., Bemus Point, N.Y.
REVIEW AND CRITICAL ANALYSIS: ROLLING-ELEMENT BEARINGS FOR SYSTEM LIFE AND RELIABILITY Final Report
Arthur S. Irwin, William J. Anderson, and William J. Derner Mar. 1985 234 p
(Contract NAS3-23520)
(NASA-CR-174710; NAS 1.26:174710; USAAVSCOM-TR-85-F-1) Avail: NTIS HC A11/MF A01 CSCL 13I

A ball and cylindrical roller bearing technical specification which incorporates the latest state-of-the-art advancements was prepared for the purpose of improving bearing reliability in U.S. Army aircraft. The current U.S. Army aviation bearing designs and applications, including life analyses, were analyzed. A bearing restoration and refurbishment specification was prepared to improve bearing availability. Author

N86-24992*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
TESTING OF YUH-61A HELICOPTER TRANSMISSION IN NASA LEWIS 2240-kW (3000-hp FACILITY
Andrew M. Mitchell, Fred B. Oswald, and Fredrick T. Schuller Mar. 1986 28 p refs
(NASA-TP-2538; E-2801; NAS 1.60:2538) Avail: NTIS HC A03/MF A01 CSCL 01C

A helicopter transmission that was being considered for the Army's Utility Tactical Transport Attack System (UTTAS) was tested in the NASA Lewis 2240-kW (3000-hp) test facility to obtain the transmission's operational data. The results will form a vibration and efficiency data base for evaluation similar-class helicopter transmissions. The transmission's mechanical efficiency was determined to be 98.7 percent at its rated power level of 2080 kW (2792 hp). At power levels up to 113 percent of rated the transmission displayed 56 percent higher vibration acceleration levels on the right input than on the left input. Both vibration signature analysis and final visual inspection indicated that the right input spiral-bevel gear had poor contact patterns. The highest vibration meter level was 52 g's rms at the accessory gear, which had free-wheeling gearsets. At 113 percent power and 100 percent rated speed the vibration meter levels generally ranged from 3 to 25 g's rms. Author

N86-24993*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ADJUSTABLE MOUNT FOR ELECTRO-OPTIC TRANSDUCERS IN AN EVACUATED CRYOGENIC SYSTEM Patent Application
Edward A. Crossley, Jr., inventor (to NASA), David P. Hayes, inventor (to NASA), Howard C. Jones, inventor (to NASA), and Irby W. Jones, inventor (to NASA) Filed 20 Feb. 1986 16 p

(NASA-Case-LAR-13100-1; NAS 1.71:LAR-13100-1; US-Patent-Appl-SN-831377) Avail: NTIS HC A02/MF A01 CSCL 13I

The invention is a five-degree of freedom adjustable mounting device for positioning an electro-optic transducerr in an evacuated, cryogenic chamber. Electro-optic transducers are used in this manner as high sensitivity detectors of gas emission lines in spectroscopic analysis. The mount is made up of an adjusting mechanism and a transducer mount. This combination avoids many difficulties with prior devices by permitting the use of an internal lens and allowing independent adjustment of each degree of freedom. The transducer mount, although attached to the adjusting mechanism, is isolated thermally such that a cryogenic environment can be maintained at the transducer while the adjusting mechanism remains at room temperature. Radiation shields also are incorporated to further reduce heat flow to the transducer location. Features of this invention include the use of an internal lens and mechanizing of an adjustment device which allows for independent adjustments. An adjustment of one parameter will not affect the setting of any other parameter. This result is achieved by locating the centers of rotation of the angular adjustment at the focal point of the internal lens. NASA

N86-24994# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France). Structures and Materials Panel.

FATIGUE RATED FASTENER SYSTEMS

H. H. vanderLinden, ed. Loughton, England 1985 96 p refs (AGARD-R-721; ISBN-92-835-1512-9) Avail: NTIS HC A05/MF A01

In recent years the aerospace industry has developed many ways of joining parts together; despite all innovations, however, the most common means of doing this remains the mechanical fastener. The designer needs to know which fastener systems are the most efficient from his point of view; this report is the outcome of a collaborative program (sponsored by the Structures and Materials Panel of AGARD) which aimed to evaluate some of the available Fatigue-rated Fastener Systems. The program studied a number of systems; tests covered not only the fasteners themselves but also the preparation of the holes and the quality of fit. Author

N86-24995# Cornell Univ., Ithaca, N.Y.

THE DESIGN AND CONSTRUCTION OF A MAGNETIC BEARING

Timothy P. Malone Dec. 1981 74 p refs (AD-A163552; FDA-81-11) Avail: NTIS HC A04/MF A01 CSCL 13/9

The design and construction of a practical magnetic bearing are discussed. Specifically, the advantages of magnetic levitation, the structure and components, the control system used, a second order simulation, and a simulation using actual magnet characteristics, and the special power amplifiers built for this project are discussed. The physical structure described in this report has not been completed so the question of whether this suggested design will work is still in doubt. The problems encountered during construction and the preliminary tests indicate the difficulty of the project. The project is not hopeless though since SKF Industries is now marketing a magnetic bearing. Author (GRA)

N86-24996# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.

ADAPTIVE CONTROL, LEARNING, AND COST-EFFECTIVE SENSOR SYSTEMS FOR ROBOTICS OR ADVANCED AUTOMATION SYSTEMS Final Report, 1 Aug. 1984 - 31 Dec. 1985

J. L. Nevins, A. C. Edsall, T. M. Stepien, M. E. Kaliski, and A. A. Karadeniz 31 Dec. 1985 80 p (Contract N00014-83-K-0587) (AD-A163615; CSDL-R-1829) Avail: NTIS HC A05/MF A01 CSCL 06/4

The hypothesis of this grant is that the non-deterministic class of problems is amenable to the techniques and methodologies of control system engineering; a discipline which provides a tractable approach for addressing the issues for intelligent systems with cost effectiveness and performance optimality. The objectives of this grant are: (1) To explore the use of adaptive-learning control systems to complex processes or engineering-based expert systems to an inspecton type task. Both types of tasks which are usually performed by humans involve modeling and control or automatic data interpretation in the presence of noisy data with incomplete and time-varying models. (2) To determine the relevance of these approaches to research on intelligent robotic systems. (3) To determine a focus for testing these theories both analytically and experimentally, if possible. GRA

N86-24997# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

AUTOMATING KNOWLEDGE ACQUISITION IN A FLIGHTLINE ROBOT M.S. Thesis

William M. Clifford Dec. 1985 170 p refs (AD-A163829; AFIT/GE/ENG/85D-7) Avail: NTIS HC A08/MF A01 CSCL 06/4

Robots enjoy widespread use in industry on simplistic repetitive tasks in a controlled environment. Tasks in the military domain, particularly the flightline, require mobility and intelligence. While the mobility issue is being addressed, the intelligence issue is not. By giving the robot the ability to learn from a novice, the robot could be placed on the flightline and learn what it needs to know from the domain experts. Rather than deal with a toy problem, this work takes the actual refueling Job Guides for two aircraft and shows how these can be used directly by a computer. The process involves three steps. First, the text is transformed into a common natural language processor form. Second, the forms are examined to allow the commonalty between the two refueling tasks to be extracted. The forms are expanded by applying expert system and planning techniques to include missing domain and world knowledge. Finally, the forms are examined to allow the commanalty between the two refueling tasks to be extracted. GRA

N86-24998# Naval Ship Research and Development Center, Annapolis, Md. Ship Materials Engineering Dept.

EFFECT OF FORCED CONVECTION HEAT TRANSFER ON WELD POOLS

M. E. Wells and W. E. Lukens Jan. 1986 41 p refs (AD-A163970; DTNSRDC/SME-85/62) Avail: NTIS HC A03/MF A01 CSCL 11/6

A method has been developed to apply forced convection heat transfer by gas jet impingement to weld metals deposited by the Gas Tungsten Arc Welding (GTAW) process at heat inputs in excess of 100 kJ/in. The method involves the use of multiple gas jets directed at the surface of the weld pool to increase convective heat transfer (i.e., forced convective cooling). Autogenous bead-on-plate welds were made in a titanium alloy with and without forced convective cooling. All welding variables were maintained constant, only the introduction of the cooling gas during welding was different. The weld pool geometry, temperature distributions, macrostructure and microstructure of the welds were evaluated. The results of visual and macrostructural observations indicate that forced convective cooling forms a refined weld metal macrostructure through control of the weld pool geometry. In addition to grain refinement, forced convective cooling modifies the shape of the weld bead. The depth to width ratio of the weld bead increases and the width of the weld HAZ decreases. The results of temperature measurements indicate that forced convective cooling increases the weld metal cooling rate. By increasing the cooling rate the time at transformation is suppressed and a finer weld metal microstructure is produced. Additionally, the weld pool surface temperature decreases and thermal gradients near the solid-liquid interface also decrease. GRA

N86-24999# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A ROBOT VISION SYSTEM Ph.D. Thesis

James R. Holten, III Dec. 1985 209 p refs (AD-A164202; AFIT/DS/ENG/85D-1) Avail: NTIS HC A10/MF A01 CSCL 17/7

This project includes the design and implementation of a

vision-based goal achievement system. The system relies only on ambient light, and through the use of a passive vision system, allows an autonomous roving vehicle to traverse an environment to a goal. The project includes visual processing of stereo optical image sequences into a 3-dimensional model, and the generation of a path through the model. The system outputs the sequence of robot commands necessary to traverse the path, modifying the path as needed during the traversal to compensate for vehicle and environment variations from the model. A unit designed with these characteristics can act as the heart of a general purpose autonomous vehicle transport platform. This dissertation achieved the implementation and evaluation of a stereo vision system, as well as outlining the modelling requirements, and proposing modelling and path-finding algorithms to support the full project.
GRA

N86-25000# National Aeronautics and Space Administration, Washington, D.C.
STRUCTURAL DESIGN AND KINEMATIC CONFIGURATION OF TWO-ARMED ROBOTS
I. I. Pavlenko, ed. 1985 13 p refs Transl. into ENGLISH from Vestnik Mashinostroyeniya (USSR), No. 12, Dec. 1983 p 5-9 Previously announced as N85-27037 Transl. by SCITRAN, Inc., Santa Barbara, Calif.
(Contract NASw-4004)
(NASA-TM-88419; NAS 1.15:88419) Avail: NTIS HC A02/MF A01 CSCL 05H

It is best to determine the structural design and kinematic variants of two-armed robots without considering the degrees of mobility of the kinematics of the base or the degrees of mobility common to the kinematically coupled arms of the kinematics of the wrists, since these motions comprise separate kinematic groups to be analyzed independently. The structural configurations of two-armed robots are those which are distinguished by distribution of the degrees of mobility between the arms, the composition of the kinematic pairs, the kinds of motions they can execute and the relative positioning with respect to each hand. Five degrees of mobility for the robot arms with nine different variants of the distribution of degrees of mobility between the arms are defined and the possible configurations of the kinematic pairs are analyzed. The options are summarized in tabular form and a set of schematic drawings.
Author

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N86-25001*# College of William and Mary, Williamsburg, Va. Dept. of Physics.
QUANTITATIVE NON-DESTRUCTIVE TESTING Annual Report, 1 May 1984 - 30 Apr. 1985
C. S. Welch 1985 43 p refs
(Contract NCC1-50)
(NASA-CR-176761; NAS 1.26:176761) Avail: NTIS HC A03/MF A01 CSCL 14D

The work undertaken during this period included two primary efforts. The first is a continuation of theoretical development from the previous year of models and data analyses for NDE using the Optical Thermal Infra-Red Measurement System (OPTITHIRMS) system, which involves heat injection with a laser and observation of the resulting thermal pattern with an infrared imaging system. The second is an investigation into the use of the thermoelastic effect as an effective tool for NDE. As in the past, the effort is aimed towards NDE techniques applicable to composite materials in structural applications. The theoretical development described produced several models of temperature patterns over several geometries and material types. Agreement between model data and temperature observations was obtained. A model study with one of these models investigated some fundamental difficulties with the proposed method (the primitive equation method) for obtaining diffusivity values in plates of thickness and supplied guidelines for avoiding these difficulties. A wide range of computing speeds was found among the various models, with a one-dimensional model based on Laplace's integral solution being both very fast and very accurate.
Author

N86-25002*# Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
STRESS WAVES IN TRANSVERSELY ISOTROPIC MEDIA: THE HOMOGENEOUS PROBLEM Final Report
Elizabeth R. C. Marques and James H. Williams, Jr. Washington NASA May 1986 48 p refs
(Grant NAG3-328)
(NASA-CR-3977; E-2949; NAS 1.26:3977) Avail: NTIS HC A03/MF A01 CSCL 14D

The homogeneous problem of stress wave propagation in unbounded transversely isotropic media is analyzed. By adopting plane wave solutions, the conditions for the existence of the solution are established in terms of phase velocities and directions of particle displacements. Dispersion relations and group velocities are derived from the phase velocity expressions. The deviation angles (e.g., angles between the normals to the adopted plane waves and the actual directions of their propagation) are numerically determined for a specific fiber-glass epoxy composite. A graphical method is introduced for the construction of the wave surfaces using magnitudes of phase velocities and deviation angles. The results for the case of isotropic media are shown to be contained in the solutions for the transversely isotropic media.
Author

N86-25003*# Pratt and Whitney Aircraft, East Hartford, Conn. Engineering Div.
LIFE PREDICTION AND CONSTITUTIVE MODELS FOR ENGINE HOT SECTION ANISOTROPIC MATERIALS PROGRAM Annual Status Report
G. A. Swanson, I. Linask, D. M. Nissley, P. P. Norris, T. G. Meyer, and K. P. Walker Feb. 1986 203 p refs
(Contract NAS3-23939)
(NASA-CR-174952; NAS 1.26:174952; PWA-5968-19) Avail: NTIS HC A09/MF A01 CSCL 14D

This report presents the results of the first year of a program designed to develop life prediction and constitutive models for two coated single crystal alloys used in gas turbine airfoils. The two alloys are PWA 1480 and Alloy 185. The two oxidation resistant coatings are PWA 273, an aluminide coating, and PWA 286, an overlay NiCoCrAlY coating. To obtain constitutive and/or fatigue data, tests were conducted on coated and uncoated PWA 1480 specimens tensilely loaded in the < 100 >, < 110 >, < 111 >, and < 123 > directions. A literature survey of constitutive models was completed for both single crystal alloys and metallic coating materials; candidate models were selected. One constitutive model under consideration for single crystal alloys applies Walker's micromechanical viscoplastic formulation to all slip systems participating in the single crystal deformation. The constitutive models for the overlay coating correlate the viscoplastic data well. For the aluminide coating, a unique test method is under development. LCF and TMF tests are underway. The two coatings caused a significant drop in fatigue life, and each produced a much different failure mechanism.
Author

N86-25004# University of South Florida, Tampa. Dept. of Electrical Engineering.
MICROENVIRONMENTAL MOISTURE RESEARCH Final Technical Report
J. M. Ammons, J. H. Linn, M. G. Kovac, and W. E. Swartz Griffiss AFB, N.Y. RADC Apr. 1985 124 p refs
(Contract F30602-80-C-0169)
(AD-B157859; RADC-TR-85-58) Avail: NTIS HC A06/MF A01 CSCL 09/5

The advancement of reliability physics is the foundation for increased microelectronic circuit reliability. A common denominator for many types of failure mechanisms in integrated circuits is water trapped within the package cavity. An understanding of the

fundamental interaction of water with package materials is essential. The nature of its sources, dynamics of interaction, and its role in failure mechanisms were elucidated. The nature and history of surfaces are known to influence adsorption/desorption properties particularly with respect to water. The chemical composition and morphology of the surface under investigation must be established. All test structures and their treatment should closely approximate those found in production run packages in order to infer parallel response characteristics. The preparation and treatment of test samples for use was done to simulate various stages of manufacturing. Comparison to production samples was done where possible. B.G.

N86-25005# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
VERIFICATION OF A MONTE CARLO SIMULATION METHOD TO FIND LOWER CONFIDENCE LIMITS FOR THE AVAILABILITY AND RELIABILITY OF MAINTAINED SYSTEMS M.S. Thesis
Karen S. Barland Dec. 1985 60 p refs
(AD-A163832; AFIT/GSO/MA/85D-2) Avail: NTIS HC A04/MF A01 CSCL 14/4

This thesis determined the feasibility and efficiency of a Monte Carlo method of simulating the lower confidence limits for the availabilities and reliabilities of maintained systems. The steady-state availabilities of single-unit systems and the time-constrained availabilities and reliabilities of two-unit parallel systems were simulated. First, a baseline of true exponentially-distributed Mean Time Between Failures (MTBFs) and Mean Time To Repairs (MTTRs) were simulated using the chi-square distribution. Then other MTBFs and MTTRs were simulated to represent sampling of other systems. The availabilities and reliabilities were found using these simulated MTBFs and MTTRs. Next, simulated availabilities and reliabilities were ordered, and lower confidence limits were found. These lower confidence limit point estimates were compared against the systems' exact availabilities and reliabilities. Lastly, the success of this Monte Carlo method is determined by how well the simulated lower confidence limit availability and reliability point estimates cover the exact availabilities and reliabilities. Author (GRA)

N86-25006# Florida State Univ., Tallahassee.
FAILURE TIMES IN MAINTENANCE MODELS
Wai Chan and Jayaram Sethuraman Sep. 1985 26 p refs
(Contract DAAG29-82-K-0168)
(AD-A163891; FSU-Statistics-M709; TR-D-83-ARO; ARO-19367.32-MA) Avail: NTIS HC A03/MF A01 CSCL 15/5

Several kinds of repairs and maintenance models are described. After studying some properties of the stochastic process of failure times, the authors compare different maintenance models by comparing the expected number of failures in time. Author (GRA)

N86-25007# Hughes Aircraft Co., Fullerton, Calif. Ground Systems Group.
RADC (ROME AIR DEVELOPMENT CENTER) NONELECTRONIC RELIABILITY NOTEBOOK. REVISION B Interim Report, Jul. 1982 - Aug. 1985
John E. Angus, Jack M. Finkelstein, Mal Yerasi, and Donald W. Fult Oct. 1985 610 p refs Supersedes RADC-TR-75-22
(Contract F30602-82-C-0127)
(AD-A163900; HAC-FR84-16-446-Rev-B; RADC-TR-85-194-Rev-B; RADC-TR-752-Rev-B) Avail: NTIS HC A99/MF A01 CSCL 13/9

Failure data and reliability methods pertaining to a variety of applications are discussed. The objective was the collection, analysis, and presentation of nonelectronic component failure data and the presentation of analytical methods that form the state-of-the-art in nonelectronic reliability analysis. Topics include: applicable statistical methods for nonelectronic reliability; reliability specifications; special application methods for reliability prediction; part failure characteristics; and reliability demonstration tests. GRA

N86-25008# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
ROBUST ESTIMATION OF THE LOCATION PARAMETER OF LIFE DISTRIBUTIONS M.S. Thesis
Linda M. Allen Dec. 1985 59 p refs
(AD-A163993; AFIT/GSO/MA/85D-1) Avail: NTIS HC A04/MF A01 CSCL 12/1

This thesis determined that for time to failure distributions that are moderate deviations from the negative exponential distribution, a robust estimate of the minimum life could be arrived at by assuming the underlying distribution was exponential and using the minimum variance, unbiased, maximum likelihood estimator. It was found that estimators using the minimum distance statistics of Kolmogorov, Cramer-von Mises, and Anderson-Darling did not perform well with the asymmetric distributions explored in this thesis. However, they may still prove useful for life distributions with larger shape parameters. The analysis was accomplished by using Monte Carlo techniques to generate random samples of time to failure data from specific distributions, and using this empirical data to estimate the actual minimum life of the distribution. Five estimators were explored: the minimum variance, unbiased, maximum likelihood estimator of the two-parameter negative exponential distribution; the first ordered statistic; and the three minimum distance methods. The performance of these estimators was evaluated by comparing their mean square errors with the mean square error of the chosen best estimator. GRA

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N86-25009 United Kingdom Atomic Energy Authority, Risley (England). Northern Div.
STATIC AND DYNAMIC TENSILE TESTS ON WIDE X 6 CrNI 18 11 STEEL PLATES TO DEMONSTRATE THE INTEGRITY OF THE REACTOR TANK FOR THE SNR 300 FAST SODIUM-COOLED REACTOR
H. Breitling, H. Laue, P. Julisch, W. Stradtmueller, D. Sturm, and J. Wiedemann Oct. 1985 26 p ref Transl. into ENGLISH from "Statische und Dynamische Zugpruefungen mit Grossplatten aus Werkstoff X 6 CrNi 18 11 zum Integritaetsnachweis des Reaktortanks fuer den Schnellen Natriumgekuehlten Reaktor SNR 300" Stuttgart, West Germany Presented at the 11th MPA Seminar, 10-11 Oct. 1985, Stuttgart, West Germany
(BLL-Risley-TR-5280-(9091.9F)) Avail: British Library Lending Div., Boston Spa, Engl.

The reactor tank of the SNR 300 fast sodium cooled reactor was subjected to a safety assessment which took account of the results of wide plate tensile tests, in which the elongation at maximum load was applied as the instability criterion. The wide plates were, to the greater part, welded in the longitudinal and transverse directions and incorporated experimental flaws, approximately 60 mm long and of defined depth and orientation, in order to take account of any undetected cracks in the original component. The tensile tests were carried out at temperatures up to 550 deg C and included dynamic tests as well as conventional quasistatic, so as to simulate stressing conditions in the tank during a hypothetical power excursion. The reference strain rate during these tests was epsilon = I/s. Under quasistatic loading, flaw free plates reached elongations of approximately 33% and approximately 7.5% under dynamic loading with artificial defects in the form of a central slit or fatigue crack. With comparable plates, no significant differences were observed between the results of quasistatic and dynamic tests. Author

N86-25010 United Kingdom Atomic Energy Authority, Risley (England). Northern Div.

BEHAVIOUR OF DYNAMICALLY LOADED PIPES WITH CIRCUMFERENTIAL FLAWS UNDER INTERNAL PRESSURE AND EXTERNAL BENDING LOADS

D. Sturm, W. Stoppler, and J. Schiedermaier 1985 38 p refs Transl. into ENGLISH from "Verhalten Dynamisch Beanspruchter Rohre mit Umfangsfehlern Unter Innendruck- und Biegebeanspruchung" (West Germany) Presented at the 11th MPA Seminar, 10-11 Oct. 1985, Stuttgart, West Germany

(BLL-Risley-TR-5278-(9091.9F)) Avail: British Library Lending Div., Boston Spa, Engl.

Comparative bending tests performed on cylindrical vessels of various dimensions and materials, weakened by notches in the circumferential directions and stressed by internal pressure and external bending moments, produced no significant differences as regards load carrying capacity between bending loads applied statically and dynamically. Dynamically tested ferritic steel pipes exhibited a slightly smaller ductile fracture component on the fracture surface as compared with those stressed quasistatically. In all other cases, fracture occurred after considerable plastic deformation in the cross section under test. The engineering method used for theoretical calculation of the leak before break and corresponding flaw curves proved in all cases to lie on the safe side. Author

N86-25011 United Kingdom Atomic Energy Authority, Risley (England). Northern Div.

BEHAVIOUR OF WB 35 PIPE STEEL UNDER DYNAMIC LOADING IN HIGH-SPEED TENSILE TESTS

D. Sturm, R. Zirn, and R. Haas Apr. 1986 49 p Transl. into ENGLISH from "Verhalten des Rohrleitungswerkstoffes WB 35 bei Dynamischer Beanspruchung im Schnellzerreissversuch" Stuttgart, West Germany Presented at the 11th MPA Seminar, Stuttgart, West Germany, 10-11 Oct. 1983

(BLL-Risley-TR-5279-(9091.9F)) Avail: British Library Lending Div., Boston Spa, Engl.

Tensile tests were carried out on smooth and notched pipe strip specimens at different loading rates in order to determine the strength, deformation, and fracture behavior of type 17 MnMoV 6 4 (WB 35) steel used for pipework components. Apart from the influence of notched bar striking energy, the effect of artificial defects in the form of erosively produced notches were examined, not only in the parent metal, but also in the welds, over the temperature range of -30 to 250 C. A hydraulic high speed tensile testing machine with a zero load acceleration distance was used for carrying out the tests. At pull down speeds of approximately 7 m/s, mean stress build up rates of approximately 6 MN/sq mm s (elastic region) were reached together with integral strain rates to specimen fracture of up to 30 l/s, normalized to the measurement length L sub o (150 mm). Author

N86-25012 British Library Lending Div., Boston Spa (England).

QUESTION OF APPLICATION OF METHOD OF FINITE ELEMENTS TO PROBLEMS OF DEFORMATION OF INCOMPRESSIBLE MEDIA

E. N. Chumachenko, A. N. Skorkhodov, and A. I. Aleksandrovych 1986 7 p refs Transl. into ENGLISH from Izvestiya (USSR), no. 9, 1985 p 89-92

(BLLD-5828.4-M-36665) Avail: British Library Lending, Boston, Spa, Engl.

The authors assert that the problem of the deformation of bodies of arbitrary shape, made up of triangular or tetrahedral finite elements cannot be correctly formulated for imcompressible media within the framework of the method of finite elements. A quarter of the cross-section of a flat rectangular specimen, subjected to upsetting with the complete adhesion at the contact surface is investigated. This zone is broken down into finite rectangular elements. The possible displacements of the nodes are investigated on the assumption that the condition of incompressibility is accurately met. Computer calculations were made with the full system of equations for a number of the breakdowns. Results are discussed. Author

N86-25013 British Library Lending Div., Boston Spa (England).

COMPUTERIZED UPPER-BOUNDARY-VALUE SOLUTIONS OF PROBLEMS IN MECHANICAL WORKING OF METALS

Yu. N. Reznikov, A. Z. Zhuravlev, and A. S. Belikov 1986 8 p refs Transl. into ENGLISH from Izvestiya (USSR), no. 8, 1985 p 59-63

(BLL-M-36627-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

Upper-boundary-value solutions to OMD (mechanical metal working) problems are obtained with a computer from minimization of the flow function in rectangular elements, into which the calculation field has been divided, and a first-order polynomial was used. The developed program enables the deformation forces and metal flow speeds in the separate zones of the billet to be determined, thus enabling the examined theoretical approach to be used for solving a wide range of practical OMD problems. Author

N86-25014 British Library Lending Div., Boston Spa (England).

DETERMINATION OF MAIN STRENGTH PROPERTIES OF 9KhF ROLL STEEL

V. M. Timonin, M. V. Yaroshenko, V. A. Nikolaev, and G. N. Merinov 1986 7 p refs Transl. into ENGLISH from Stal (USSR), no. 9, 1985 p 71-72

(BLL-M-36651-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The strength, ductility, fatigue strength, and fracture toughness of 9KhF steel used for back-up roll sleeves in strip mills were studied. It is found that 9KhF steel has high static and fatigue strength but low resistance to brittle fracture. The fatigue properties show a wide scatter range and are affected by the direction and position of the specimen. E.A.K.

N86-25015 British Library Lending Div., Boston Spa (England).

DETERMINATION OF STRESS STATE FROM STRAIN STATE

V. P. Fedotov, V. N. Trubin, and A. I. Golomidov 1985 4 p refs

(BLL-M-36642-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

An examination is made of an algorithm for calculating the stresses at an arbitrary point of a body. It can be used in conditions of low elastoplastic strains with simple loading. Author

N86-25016 British Library Lending Div., Boston Spa (England).

CRACK GROWTH ON A PWR-RPV NOZZLE CORNER UNDER CYCLIC THERMAL SHOCK LOAD

J. Jansky, R. Schmitt, and G. Katzermeier 1986 23 p Transl. into ENGLISH from West German article Presented at the 11th MPR Seminar, Stuttgart, West Germany, 10-11 Oct. 1985

(BLL-Risley-TR-5284-(9091.9F)) Copyright. Avail: British Library Lending Div., Boston Spa, Engl.

The cyclic thermal shock tests on the reactor pressure vessel (RPV) nozzle corner A2 of the pressurized water reactor (PWR) plant have shown that the combined effects of the material, medium and loading require that the following factors be taken into account: (1) material, sulphur content and orientation of manganese sulphides, quality of the protective layer of magnetite, and original toughness of the materials; (2) medium, oxygen and CO2 content, concentration of the medium in the crack (fissure), and conductivity; and (3) loading, internal stresses, mean stress, interaction between cracks (if a crack field is present), coating of the crack tips (rounding off or corroding out), and loading sequence. These factors can be globally described using the K sub s values and the calculated stress distribution by means of weighting factors. The crack tip values calculated in this way generally lie below the theoretical values for single cracks. This illustrates the conservatism of the single crack analysis performed to date for the safety assessment of the PWR thermal shock tests. For the same reason previous predictions for crack growth have also been considerably overestimated. Further experiments to investigate crack growth on components under operational conditions are required, as well as testing samples in autoclaves, in order to quantify the effect of the individual factors. Author

N86-25017# California Inst. of Tech., Pasadena. Space Radiation Lab.
RESEARCH IN PARTICLES AND FIELDS Semiannual Status Report, 1 Apr. 1985 - 31 Mar. 1986
E. C. Stone, L. Davis, Jr., R. A. Mewaldt, and T. A. Prince 5 May 1986 39 p refs
(Grant NGR-05-002-160)
(NASA-CR-176763; NAS 1.26:176763) Avail: NTIS HC A03/MF A01 CSCL 20K

Research activities in cosmic rays, gamma rays, and astrophysical plasmas are reported. The astrophysical aspects of cosmic rays and gamma rays, and the radiation and electromagnetic field environment of the Earth and other planets are investigated. The investigations are carried out by energetic particle and photon detector systems flown on spacecraft and balloons. The program is directed toward the investigation of galactic, solar, interplanetary, and planetary energetic particles and plasmas. Precision measurements with high resolution in charge, mass, and energy are emphasized. E.A.K.

N86-25018*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
STATISTICAL CORRELATION ANALYSIS FOR COMPARING VIBRATION DATA FROM TEST AND ANALYSIS
T. G. Butler, R. F. Strang, L. R. Purves, and D. J. Hershfeld Feb. 1986 92 p
(NASA-TM-86081; Rept-84B0561; NAS 1.15:86081) Avail: NTIS HC A05/MF A01 CSCL 20K

A theory was developed to compare vibration modes obtained by NASTRAN analysis with those obtained experimentally. Because many more analytical modes can be obtained than experimental modes, the analytical set was treated as expansion functions for putting both sources in comparative form. The dimensional symmetry was developed for three general cases: nonsymmetric whole model compared with a nonsymmetric whole structural test, symmetric analytical portion compared with a symmetric experimental portion, and analytical symmetric portion with a whole experimental test. The theory was coded and a statistical correlation program was installed as a utility. The theory is established with small classical structures. E.A.K.

N86-25019*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MATHEMATICAL CORRELATION OF MODAL PARAMETER IDENTIFICATION METHODS VIA SYSTEM REALIZATION THEORY
Jer-Nan Juang Apr. 1986 47 p refs
(NASA-TM-87720; NAS 1.15:87720) Avail: NTIS HC A03/MF A01 CSCL 20K

A unified approach is introduced using system realization theory to derive and correlate modal parameter identification methods for flexible structures. Several different time-domain and frequency-domain methods are analyzed and treated. A basic mathematical foundation is presented which provides insight into the field of modal parameter identification for comparison and evaluation. The relation among various existing methods is established and discussed. This report serves as a starting point to stimulate additional research towards the unification of the many possible approaches for modal parameter identification. Author

N86-25020# California Univ., Los Angeles. School of Engineering and Applied Science.
STRESS-STRAIN BEHAVIOR AND FAILURE UNIAXIAL COMPOSITES IN COMBINED COMPRESSION AND SHEAR-2 Interim Technical Report
S. B. Batdorf and Robert W. C. Ko 1 Oct. 1985 17 p refs
(Contract N00014-85-K-0667)
(AD-A163477; UCLA-ENG-85-28) Avail: NTIS HC A02/MF A01 CSCL 20/11

This paper presents a theoretical approach to the problem of finding the stress-strain relations for composites under combined compression and shear. To this end, the 1-element model is replaced by a 2-element model. Both elastic and inelastic composites are explored employing graphical methods. A numerical example is worked out to illustrate the effects of combined loads on the stiffness and strength of a composite. The present theory employs a nonlinear algebraic equation. An alternative approach would be to use a linear incremental theory, leading to a linear differential equation. An analysis is offered to show that the latter approach leads to substantially the same results as the 1-element model. GRA

N86-25021# Illinois Univ., Urbana.
NONLINEAR EARTHQUAKE ANALYSIS OF CONCRETE BUILDING STRUCTURES Final Report, Jan. - Aug. 1985
Daniel P. Abrams Jan. 1986 85 p refs
(Contract N00014-83-D-0689)
(AD-A163517; NCEL-CR-86.005) Avail: NTIS HC A05/MF A01 CSCL 13/13

An initial effort aimed at development of suitable algorithms for nonlinear, dynamic response of reinforced concrete frame buildings is discussed. These algorithms employ SDOF systems and are programmed in an interactive mode for use on a microcomputer. Nonlinearity is introduced through generalized hysteresis models that are based on laboratory experiments with sub-scale, multi-story reinforced concrete buildings. Recommendations for further work include verification and sensitivity studies, experimental checking of generalized hysteresis model, and extension to a two DOF model. GRA

N86-25022# Admiralty Research Establishment, Portland (England).
FORTRAN PROGRAM FOR VIBRATION AND SOUND RADIATION OF SPHERICAL SHELL
J. H. James Jan. 1986 20 p refs
(AD-A163752; ARE/TM-(N1)-86501; DRIC-BR-98230) Avail: NTIS HC A02/MF A01 CSCL 20/1

Mathematical formulae and a FORTRAN program listing are given for calculating the response and sound radiation due to prescribed time-harmonic excitation. The program is useful for bench-mark studies. Numerical results illustrate the applicability of the various DAA forms of the exterior fluid loading term. The principal features of the work contained herein are these: (1) a FORTRAN computer program which can be used for bench-mark studies of purely numerical formulations of the vibration and sound radiation of submerged elastic structures; (2) numerical results of vibration and sound radiation which augment those obtained from other published studies, and reinforce the view that better fluid loading approximations are required in the intermediate frequency regime where resonances occur. GRA

N86-25023# Royal Signals and Radar Establishment, Malvern (England).
A DATABASE FOR COMPOUNDING STRESS INTENSITY FACTORS
A. M. Prior, D. P. Rooke, and D. J. Cartwright Apr. 1985 30 p refs
(AD-A163779; RAE-TR-85046; DRIC-BR-97684) Avail: NTIS HC A03/MF A01 CSCL 20/11

The compounding method enables stress intensity factors to be evaluated for complex geometrical configurations using the known results of simpler ancillary configurations. Implementation of the method on a computer system requires that a data file of known results be available, and that a program be written to compound solutions from that data file. A procedure is described to convert available graphical data on stress intensity factors to numerical data and store it in a direct access computer file together with identification parameters. A computer program is then described which uses the data in that file to compound stress intensity factors for other configurations. It is shown that the errors in the results from this program are within acceptable engineering tolerances. GRA

N86-25024# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE BUCKLING OF COMPOSITE CYLINDRICAL PANELS

CONSIDERING ENVIRONMENTAL EFFECTS M.S. Thesis
Anthony D. Straw Dec. 1985 127 p refs
(AD-A163878; AFIT/GAE/AA/85D-15) Avail: NTIS HC A07/MF A01 CSCL 20/11

An analytical study was conducted to determine the influence of moisture, temperature, and curvature on the bifurcation load of cylindrical, composite panels subjected to a simple shear loading. Two laminate ply orientations, (0/45/-45/90)s and (45/-452)s, were analyzed for six radii, four temperatures, and two initial moisture conditions. The eight-ply composite panels were assumed to be manufactured from a graphite/epoxy, As/3501-5. To evaluate the influence of moisture and temperature, the transverse modulus, E2, and shear modulus, G12, were degraded based on experimental test data for the AS/3501-5 system. Each ply orientation, for a 12 in. panel radius, was evaluated at 20 time/temperature conditions that ranged from 80 to 300 F, and moisture concentrations ranging from a zero moisture content to an equilibrium moisture distribution. The investigation of curvature was conducted only for the (45/-452)s laminate and at a limited number of time/temperature conditions. The bifurcation loads were determined using the STAGS-C1 finite elements shell analysis program. This reduction in the bifurcation load is significantly influenced by the change in curvature at elevated temperatures and moisture content. GRA

N86-25025# Iowa Univ., Iowa City. Coll. of Engineering.
DYNAMIC AND DESIGN SENSITIVITY ANALYSIS OF RIGID AND ELASTIC MECHANICAL SYSTEMS WITH INTERMITTENT MOTION Final Report, 12 Mar. 1982 - 30 Jun. 1985
Edward J. Haug 12 Dec. 1985 9 p refs
(Contract DAAG29-82-K-0086)
(AD-A163982; ARO-18576.15-MA) Avail: NTIS HC A02/MF A01 CSCL 20/11

Methods developed for analysis of intermittent motion, flexible system dynamics, design sensitivity, and differential-algebraic equations are summarized. New techniques for dynamics of multibody flexible systems include mixed vibration and static correction modes. Dynamic design sensitivity analysis methods were developed, using singular value decomposition. Numerical integration methods for mixed differential-algebraic equations developed are based on singular value decomposition and hybrid generalized coordinate partitioning-constraint stabilization. Citations to sixteen published papers/reports are made. GRA

N86-25026# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
PREDICTING THE EFFECTS OF OVERLOADS ON SUSTAINED-LOAD CRACK GROWTH IN A HIGH-TEMPERATURE SUPERALLOY M.S. Thesis
Robert L. Hastie, Jr. Dec. 1985 140 p refs
(AD-A164018; AFIT/GA/AA/85D-6) Avail: NTIS HC A07/MF A01 CSCL 11/6

This thesis investigates methods of modeling the effects of overloads on high-temperature sustained-load crack growth. In addition to a model previously developed for this specific problem, a computer program developed for low-temperature, high-frequency cyclic load applications was evaluated. Sustained-load hold times were converted to equivalent fatigue cycles to analyze a load spectrum, consisting of sustained-load with periodic overloads. The CRACKS crack growth program was used with the Wheeler and Willenborg models used to account for crack growth retardation due to overloads. Crack measurements were made using a electric potential system. The application of the electric potential system to crack growth measurement following overloads was extensively evaluated. GRA

N86-25027# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
A COMPUTATIONAL MODEL FOR CONTACT STRESS PROBLEMS AD-A164190 Interim Report
J. N. Reddy and P. R. Heyliger Jan. 1986 36 p refs
(Contract N00014-84-K-0552)
(AD-A164190; VPI-E-86.2) Avail: NTIS HC A03/MF A01 CSCL 20/11

A mixed finite element model based on the incremental, updated Lagrangian, nonlinear description of continuum was developed using a mixed virtual work statement, and its application to planar elastic contact problems is discussed. The computational model is evaluated by comparing the numerical results with those obtained by a displacement finite element model. The mixed model, which contains displacements and stresses as nodal degrees of freedom, yields accurate stresses while the displacements are no better than those of the displacements finite element model.
Author (GRA)

N86-25028# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
DYNAMIC MOIRE INTERFEROMETRY IN MECHANICS RESEARCH
J. S. Epstein, V. A. Deason, and W. G. Reuter 1985 13 p Presented at the DOE Symposium on Engineering Energy Sciences, State College, Pa., 11 Oct. 1985
(Contract DE-AC07-76ID-01570)
(DE86-004128; EGG-M-25885; CONF-8510237-1) Avail: NTIS HC A02/MF A01

A brief review of moire interferometry is provided and some of the innovative concepts being pursued in dynamic moire interferometry outlined. Two areas are highlighted: the stress wave crack diffraction problem in steel, and the local effects of structural crack tip resonance in steel. DOE

N86-25029# Oak Ridge National Lab., Tenn.
SOME ADVANCES IN FRACTURE STUDIES UNDER THE HEAVY-SECTION STEEL TECHNOLOGY PROGRAM
C. E. Pugh, W. R. Corwin, R. H. Bryan, and B. R. Bass 1985 29 p Presented at the 11th MPA Seminar, Oak Ridge, Tenn., 10-11 Oct. 1985
(Contract DE-AC05-84OR-21400)
(TI85-018096; CONF-8510153-1) Avail: NTIS HC A03/MF A01

Recent results are summarized from HSST studies in three major areas that relate to assessing nuclear reactor pressure vessel integrity under pressurized-thermal-shock (PTS) conditions. These areas are irradiation effects on the fracture properties of stainless steel cladding, crack run-arrest behavior under nonisothermal conditions, and fracture behavior of a thick-wall vessel under combined thermal and pressure loadings. A stainless steel overlay cladding, applied by a submerged arc, single-wire, oscillating-electrode method, was irradiated. Yield strength increases up to 27% and a slight increase in ductility was observed. Charpy V-Notch data showed a ductile-to-brittle transition behavior caused by temperature-dependent failure of the delta-ferrite phase. The type 308 cladding, microstructurally typical of that in reactor pressure vessels, showed very little degradation in either upper-shelf energy or transition temperature due to irradiation. Crack-arrest behavior of A533 grade B class 1 steel was examined for temperatures extending above the onset of Charpy upper-shelf. Recent results are summarized from HSST studies in three major areas that relate to assessing Charpy upper-shelf. DOE

42 GEOSCIENCES (GENERAL)

N86-25030*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GEOPOTENTIAL RESEARCH MISSION SCIENCE, ENGINEERING AND PROGRAM SUMMARY
Thomas Keating, ed., Patrick Taylor, ed., Werner Kahn, ed., and Francis Lerch, ed. May 1986 203 p refs
(NASA-TM-86240; NAS 1.15:86240) Avail: NTIS HC A10/MF A01 CSCL 08B

The accumulated scientific and engineering studies pertaining to the Geopotential Research Mission (GRM) are presented. The scientific need and justification for the measurement of the Earth's

gravity and magnetic fields are discussed. Emphasis is placed on the studies and conclusions of scientific organizations and NASA advisory groups. The engineering design and investigations performed over the last 4 years are described, and a spacecraft design capable of fulfilling all scientific objectives is presented. In addition, critical features of the scientific requirements and state-of-the-art limitations of spacecraft design, mission flight performance, and data processing are discussed. Author

N86-25031# Geological Survey, Reston, Va.
A STRATEGY FOR ADOPTION OF ACCELERATOR MASS SPECTROMETRY BY THE EARTH SCIENCES
B. R. Doe, Louis Brown (Carnegie Institution of Washington, D.C.), David Elmore (Rochester Univ., N.Y.), Gregory Herzog (Rutgers - The State Univ., New Brunswick, N.J.), Theodore Kruse (Rutgers - The State Univ., New Brunswick, N.J.), Roy Middleton (Pennsylvania Univ., Philadelphia), John Morgan, R. A. Muller (California Univ., Berkeley), and John Reynolds (California Univ., Berkeley) 1984 38 p
(TI85-901777; USGS-OFR-84-664) Avail: NTIS HC A03/MF A01

Four steps are involved in mass spectrometry for the analysis of the isotopes of an element: (1) volatilization; (2) ionization of the element; (3) acceleration of the ions through a potential field; and (4) separation of the isotopes. Accelerator mass spectrometers (AMS) produce ions with much higher energies in the megavolt range than conventional mass spectrometry. The cyclotron was the first accelerator used for radioisotope dating, and was followed by measurements with tandem Van de Graaff accelerators. Decrease in the use of lower-energy tandem Van de Graaff accelerators for nuclear physics stimulated their use in Earth science. The tandem Van de Graaff's advantages as a mass spectrometer, are discussed. It is found that accelerator mass spectrometry is in a particularly precarious state. The great potential of the use of terrestrial cosmogenic radionuclides, some of which can only be practically determined by AMS, is examined. The development of a strategy for adoption of accelerator mass spectrometry by the Earth sciences is discussed. E.A.K

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N86-25032# National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.
DUCKS UNLIMITED JOINT RESEARCH PROJECT Final Report
C. L. Hill Dec. 1985 175 p refs
(NASA-TM-88755; NAS 1.15:88755; ERL-238) Avail: NTIS HC A08/MF A01 CSCL 13B

The feasibility of using LANDSAT thematic mapper (TM) data and geographic information system technology as part of a waterfowl habitat inventory and assessment program was determined. The TM data analysis offers interesting results in wetland mapping. The best technique is the one that utilizes a distance derived mask as input to a modified orthogonal parallelepiped classifier. The classification technique (CLPIPE) and the statistical software module (FIND) are incorporated into a production software runstream (DUCK.CAN). The production runstream allows analysis with geographically referenced raw data, to complete the classification process, develop statistical reports, and produce final output products in the form of maps and tables. It is concluded that the TM has the capability to spectrally identify wetland categories. E.A.K.

N86-25033# National Aeronautics and Space Administration, Washington, D.C.
EARTH RESOURCES: A CONTINUING BIBLIOGRAPHY WITH INDEXES (ISSUE 49)
Apr. 1986 152 p
(NASA-SP-7041(49); NAS 1.21:7041(49)) Avail: NTIS HC A06 CSCL 05B

This bibliography lists 515 reports, articles, and other documents introduced into the NASA scientific and technical information system. Emphasis is placed on the use of remote sensing and geophysical instrumentation in spacecraft and aircraft to survey and inventory natural resources and urban areas. Subject matter is grouped according to agriculture and forestry, environmental changes and cultural resources, geodesy and cartography, geology and mineral resources, hydrology and water management, data processing and distribution systems, instrumentation and sensors, and economic analysis. B.G.

N86-25034*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CONCEPTUAL DESIGN STUDY: FOREST FIRE ADVANCED SYSTEM TECHNOLOGY (FFAST)
J. David Nichols and John R. Warren (Department of Agriculture, Washington, D.C.) 15 Feb. 1986 132 p refs
(Contract NAS7-918)
(JPL-Publ-86-5) Avail: NTIS HC A07/MF A01 CSCL 02F

An integrated forest fire detection and mapping system that will be based upon technology available in the 1990s was defined. Uncertainties in emerging and advanced technologies related to the conceptual design were identified and recommended for inclusion as preferred system components. System component technologies identified for an end-to-end system include thermal infrared, linear array detectors, automatic georeferencing and signal processing, geosynchronous satellite communication links, and advanced data integration and display. Potential system configuration options were developed and examined for possible inclusion in the preferred system configuration. The preferred system configuration will provide increased performance and be cost effective over the system currently in use. Forest fire management user requirements and the system component emerging technologies were the basis for the system configuration design. A preferred system configuration was defined that warrants continued refinement and development, examined economic aspects of the current and preferred system, and provided preliminary cost estimates for follow-on system prototype development. B.G.

N86-25035# Los Alamos Scientific Lab., N. Mex.
CHEMICAL, PETROGRAPHIC AND K-Ar AGE DATA TO ACCOMPANY RECONNAISSANCE GEOLOGIC STRIP MAP FROM KINGMAN TO SOUTH OF BILL WILLIAMS MOUNTAIN, ARIZONA
Barbara Arney, Fraser Goff, and Andrea C. Eddy Apr. 1985 28 p refs Sponsored by DOE
(DE85-014242; LA-10409-HDR) Avail: NTIS HC A03/MF A01

As part of a reconnaissance mapping project, 40 chemical analyses and 13 potassium/argon age dates were obtained from Tertiary volcanic and Precambrain granitic rocks between Kingman and Bill Williams Mountain, Arizona. The dated volcanic rocks range in age from 5.5 + or - 0.2 Myr for basalt in the East Juniper Mountains to about 25 Myr for a biotite pyroxene andesite. The date for Picacho Butte, a rhyodacite in the Mt. Floyd volcanic field, was 9.8 + or - 0.07 Myr, making it the oldest rhyodacite dome in that volcanic field. Dated rocks in the Fort Rock area range from 20.7 to 24.3 Myr. No ages were obtained on the Precambrian rocks. Compositionally, the volcanic rocks analyzed range from alkali basalt to rhyolite, but many rocks on the western side of the map area are unusually potassic. The granites chosen for analysis include syenogranite from the Hualapai Mountains, a muscovite granite from the Picacho Butte area, and two other granites. The chemical and K/Ar age data and petrographic descriptions included in this report accompany the reconnaissance geologic strip map published as LA-9202-MAP. DOE

N86-25036# EG and G Energy Measurements, Inc., Las Vegas, Nev.
COMPREHENSIVE INTEGRATED REMOTE SENSING FOR US

DEPARTMENT OF ENERGY APPLICATIONS
L. R. Tinney and J. G. Lackey 1985 10 p refs Presented at the International Conference on Man's Role in Changing the Global Environment, Venice, Italy, 21 Oct. 1985
(Contract DE-AC08-83NV-10282)
(DE86-002101; EGG-10282-1096; CONF-8510222-1) Avail: NTIS HC A02/MF A01

A major remote sensing program of the Department of Energy (DOE) is described and examples of processed data are presented. The program is termed Comprehensive Integrated Remote Sensing, or CIRS, and involves equipment and personnel of the DOE Remote Sensing Laboratory. Data is being collected to support environmental and emergency response functions for large DOE sites. Integration of the data is being enhanced by implementation of a geographic information system. DOE

N86-25037# Geological Survey, Syosset, N. Y. Water Resources Div.
WATER RESOURCES DATA FOR NEW YORK, WATER YEAR 1984. VOLUME 2: LONG ISLAND Annual Water Data Report, 1 Oct. 1983 - 30 Sep. 1984
A. G. Spinello, J. H. Nakao, W. J. Flipse, and J. G. Carcaci May 1985 292 p
(PB86-137338; USGS/WRD/HD-85/246; USGS/WRD/NY-84/2) Avail: NTIS HC A13/MF A01 CSCL 08H

Water resources data for the 1984 water year for New York consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of ground water wells. The volume contains records of water discharge at 17 gaging stations; water quality at 17 gaging stations, 884 wells; and water levels at 139 observation wells. Also included are data for 79 low-flow partial-record stations. GRA

N86-25038# Geological Survey, Doraville, Ga. Water Resources Div.
WATER RESOURCES DATA FOR GEORGIA, WATER YEAR 1984 Annual Water Data Report, 1 Oct. 1983 - 30 Sep. 1984
W. R. Stokes, T. W. Hale, J. L. Pearman, and G. R. Buell Jul. 1985 394 p
(PB86-127016; USGS/WRD/HD-85/259; USGS/WRD/GA-85/1) Avail: NTIS HC A17/MF A01 CSCL 08H

Water resources data for the 1984 water year for Georgia consist of records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs; and ground water levels. Discharge records of 108 gaging stations; stage for 11 gaging stations; stage and contents for 17 lakes and reservoirs; water quality for 14 continuous stations, 109 periodic stations and miscellaneous sites; peak stage and discharge only for 130 crest stage partial record stations and 44 miscellaneous sites; and water levels of 27 observation wells are presented. GRA

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N86-25039*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PRINCIPLES FOR SYSTEM LEVEL ELECTROCHEMISTRY
Lawrence H. Thaller 1986 13 p refs Presented at the 15th International Power Sources Symposium, Brighton, England, 7-11 Sep. 1986
(NASA-TM-87283; E-2908; NAS 1.15:87283) Avail: NTIS HC A02/MF A01 CSCL 10C

The higher power and higher voltage levels anticipated for future space missions have required a careful review of the techniques currently in use to preclude battery problems that are related to the dispersion characteristics of the individual cells. Not only are the out-of-balance problems accentuated in these larger systems, but the thermal management considerations also require a greater degree of accurate design. Newer concepts which employ active cooling techniques are being developed which permit higher rates of discharge and tighter packing densities for the electrochemical components. This paper will put forward six semi-independent principles relating to battery systems. These principles will progressively address cell, battery and finally system related aspects of large electrochemical storage systems. Author

N86-25040*# United Technologies Corp., South Windsor, Conn. Fuel Cell Operations.
ADVANCED ON-SITE POWER PLANT DEVELOPMENT TECHNOLOGY PROGRAM Annual Report, 1983
Jun. 1984 155 p refs
(Grant DEN3-289; Contract DE-AI21-80ET-17088)
(NASA-CR-174709; DOE/NASA/0289-1; NAS 1.26:174709; PSD-FCR-5715) Avail: NTIS HC A08/MF A01 CSCL 10B

A 30-cell, full area short stack containing advanced cell features was tested for 2900 hours. A stack acid addition approach was selected and will be evaluated on the stack at 5000 hours test time. A brassboard inverter was designed and fabrication was initiated. Evaluation of this brassboard inverter will take place in 1984. A Teflon coated commercial heat exchanger was selected as the preferred approach for the acid condenser. A reformer catalyst with significantly less pressure drop and equivalent performance relative to the 40-K baseline catalyst was selected for the development reformer. The early 40-kW field power plant history was reviewed and adjustments were made to the On-Site Technology Development Program to address critical component issues. Author

N86-25041# National Aeronautics and Space Administration, Washington, D.C.
PROCESS FOR PRODUCING AN ELECTRODE MEMBRANE UNIT FOR HYDROGEN/BROMINE CELLS
Karl Hoehne Apr. 1986 9 p refs Transl. into ENGLISH of West German patent no. DE-3334330-A1 (4 Apr. 1985) p 1-9 Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-4004)
(NASA-TM-88396; NAS 1.15:88396) Avail: NTIS HC A02/MF A01 CSCL 10C

A method for producing an electrode membrane unit for hydrogen/bromine cells, consisting of catalyst material and a cation exchange membrane made of perfluorosulfonated polytetrafluoreth-ylene is described. Author

N86-25042*# Georgia Inst. of Tech., Atlanta.
TECHNOLOGY FOR SATELLITE POWER CONVERSION Semiannual Technical Report
M. A. Gouker, D. P. Campbell, and J. J. Gallagher 16 May 1986 10 p refs
(Grant NAG3-282)
(NASA-CR-176777; NAS 1.26:176777) Avail: NTIS HC A02/MF A01 CSCL 10A

The work performed in this reporting period has concentrated on the metal-oxide-metal (MOM) diode. The fabrication procedure begins with the deposition of gold probing pads to provide a non-oxidizing contact to test the dc characteristics to the diode accurately. A thin patch capped with an insulating SiO2 layer, is deposited next to form the first half of the diode. The other half of the diode, typically Ni, is deposited completing the conduction path from the oxidized edge of the Ni patch to the opposite gold probing pad. It is important in this step that the last metallization take place without exposing the newly oxidized surface to the atmosphere. Successful production of diodes has been achieved. Work on millimeter wave frequency rectennas incorporating known semiconductor diode technology has been initiated. Author

N86-25043*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SILICON PRODUCTION IN A FLUIDIZED BED REACTOR Final Report
Naresh K. Rohatgi Apr. 1986 72 p refs
(Contract NAS7-918; JPL Proj. 5101-296; Contract DE-AI01-85CE-89008)
(JPL-Publ-86-17; DOE/JPL-1012-123) Avail: NTIS HC A05/MF A01 CSCL 10A

Part of the development effort of the JPL in-house technology involved in the Flat-Plate Solar Array (FSA) Project was the investigation of a low-cost process to produce semiconductor-grade silicon for terrestrial photovoltaic cell applications. The process selected was based on pyrolysis of silane in a fluidized-bed reactor (FBR). Following initial investigations involving 1- and 2-in. diameter reactors, a 6-in. diameter, engineering-scale FBR was constructed to establish reactor performance, mechanism of silicon deposition, product morphology, and product purity. The overall mass balance for all experiments indicates that more than 90% of the total silicon fed into the reactor is deposited on silicon seed particles and the remaining 10% becomes elutriated fines. Silicon production rates were demonstrated of 1.5 kg/h at 30% silane concentration and 3.5 kg/h at 80% silane concentration. The mechanism of silicon deposition is described by a six-path process: heterogeneous deposition, homogeneous decomposition, coalescence, coagulation, scavenging, and heterogeneous growth on fines. The bulk of the growth silicon layer appears to be made up of small diameter particles. This product morphology lends support to the concept of the scavenging of homogeneously nucleated silicon. Author

N86-25044*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
OVERVIEW OF SOFTWARE DEVELOPMENT AT THE PARABOLIC DISH TEST SITE
C. K. Miyazono 15 Jul. 1985 83 p
(Contract NAS7-918; JPL Proj. 5105-155; Contract DE-AM04-80AL-13137)
(JPL-Publ-85-56; DOE/JPL-1060-90) Avail: NTIS HC A05/MF A01 CSCL 10A

The development history of the data acquisition and data analysis software is discussed. The software development occurred between 1978 and 1984 in support of solar energy module testing at the Jet Propulsion Laboratory's Parabolic Dish Test Site, located within Edwards Test Station. The development went through incremental stages, starting with a simple single-user BASIC set of programs, and progressing to the relative complex multi-user FORTRAN system that was used until the termination of the project. Additional software in support of testing is discussed including software in support of a meteorological subsystem and the Test Bed Concentrator Control Console interface. Conclusions and recommendations for further development are discussed. Author

N86-25045*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ENVIRONMENTAL TESTS OF METALLIZATION SYSTEMS FOR TERRESTRIAL PHOTOVOLTAIC CELLS
Paul Alexander, Jr. 31 Dec. 1985 79 p refs
(Contract NAS7-918; JPL Proj. 5101-280; Contract DE-AI01-76ET-20356)
(JPL-Publ-85-86; DOE/JPL-1012-113) Avail: NTIS HC A05/MF A01 CSCL 10A

Seven different solar cell metallization systems were subjected to temperature cycling tests and humidity tests. Temperature cycling excursions were -50 deg C to 150 deg C per cycle. Humidity conditions were 70 deg C at 98% relative humidity. The seven metallization systems were: Ti/Ag, Ti/Pd/Ag, Ti/Pd/Cu, Ni/Cu, Pd/Ni/Solder, Cr/Pd/Ag, and thick film Ag. All metallization systems showed a slight to moderate decrease in cell efficiencies after subjection to 1000 temperature cycles. Six of the seven metallization systems also evidenced slight increases in cell efficiencies after moderate numbers of cycles, generally less than 100 cycles. The copper based systems showed the largest decrease in cell efficiencies after temperature cycling. All metallization systems showed moderate to large decreases in cell efficiencies after 123 days of humidity exposure. The copper based systems again showed the largest decrease in cell efficiencies after humidity exposure. Graphs of the environmental exposures versus cell efficiencies are presented for each metallization system, as well as environmental exposures versus fill factors or series resistance. Author

N86-25046*# Hughes Research Labs., Malibu, Calif.
LONG LIFE NICKEL ELECTRODES FOR A NICKEL-HYDROGEN CELL: CYCLE LIFE TESTS
H. S. Lim and S. A. Verzwyvelt 1985 14 p refs Previously announced as N84-33698
(Contract NAS3-22238)
(NASA-CR-174815; NAS 1.26:174815) Avail: NTIS HC A02/MF A01 CSCL 10C

In order to develop a long life nickel electrode for a Ni/He cell, the cycle life of nickel electrodes was tested in Hi/H2 boiler plate cells. A 19 test cell matrix was made of various nickel electrode designs including three levels each of plaque mechanical strength, median pore size of the plaque, and active material loading. Test cells were cycled to the end of their life (0.5v) in a 45 minute low Earth orbit cycle regime at 80% depth-of-discharge. It is shown that the active material loading level affects the cycle life the most with the optimum loading at 1.6 g/cc void. Mechanical strength does not affect the cycle life noticeably in the bend strength range of 400 to 700 psi. It is found that the best plaque is made of INCO nickel powder type 287 and has median pore size of 13 micron. R.J.F.

N86-25047# Energy Research Corp., Danbury, Conn.
DEVELOPMENT OF 3 AND 5 kW FUEL CELL POWER PLANTS Final Technical Report, Oct. 1979 - Jul. 1985
S. Abens and M. Farooque 12 Dec. 1985 119 p
(Contract DAAK70-79-C-0249; DA Proj. 1V4-63702-DG-11)
(AD-A163603) Avail: NTIS HC A06/MF A01 CSCL 10/2

Phosphoric acid fuel cell power plants for use as tactical utility power sources have been developed. The power plants operate on 58% methanol-42% water fuel. Two fully automatic 3kW units were built, tested, and delivered. Thermal efficiency was 23% with ac and 26% with dc output. A brassboard 3kW power plant operating on neat methanol was also constructed, tested, and delivered. The methanol-water premix fuel cell power plant operates on a 1:1.3 molar mixture of methanol and water which is converted in a steam reformer, operating at 300 C, to hydrogen-rich product gas. The fuel cell uses 60 to 65% of the hydrogen to produce dc electricity, and the balance is combusted in a burner to supply heat required for the endothermic reforming process. The phosphoric acid fuel cell stack is air-cooled and operates at a temperature of 190 C. The fuel cell power plant is capable of delivering either regulated dc or ac electrical power through the use of interchangeable power conditioners. A microprocessor based controller provides event sequencing and system control during startup, shutdown and operation of the power plant. GRA

N86-25048# Ultrasystems, Inc., Irvine, Calif.
BIOMASS ECONOMY Final Report, Jun. 1984 - Nov. 1985
Stuart J. Crow Nov. 1985 136 p refs
(Contract F08635-84-C-0229)
(AD-A163647; AFESC/ESL-TR-85-27) Avail: NTIS HC A07/MF A01 CSCL 14/1

The objective of this effort was to perform an updated life cycle cost assessment of biomass energy conversion systems capable of meeting facility and process energy needs of Eglin AFB, FL. System capabilities examined in this study were 25 MWe and 15-MWe. Results of this study are that although the biomass fuel is available at a reasonable cost, construction and other operating costs are too high to justify implementation of this technology based on the current cost of electricity at Eglin AFB, FL. GRA

N86-25049# Energy Research Corp., Danbury, Conn.
DEVELOPMENT OF PARTIAL OXIDIZER/REFORMER FOR PAFC POWER PLANTS Final Technical Report, 22 Apr. 1983 - 22 Oct. 198
Larry G. Christner and George Steinfeld 15 Nov. 1985 85 p refs
(Contract DAAK70-83-C-0035; DA Proj. 1L1-62733-AH-20)
(AD-A163781) Avail: NTIS HC A05/MF A01 CSCL 10/2

The development of a methanol partial oxidation reformer designed to provide hydrogen to a 3 kW Phosphoric Acid Fuel Cell Powerplant is discussed. The partial oxidation reformer operates on neat methanol and utilizes the fuel cell cathode exhaust stream as the oxidant. GRA

N86-25050 Department of the Air Force, Washington, D.C.
VMJ SOLAR CELL FABRICATION PROCESS USING MASK ALIGNER Patent
Diane K. Hufford, inventor (to Air Force) Issued 20 Mar. 1986 4 p
(AD-D011966; US-Patent-4,547,958; US-Patent-Appl-SN-610911; US-Patent Class-29-572) Avail: US Patent and Trademark Office CSCL 10/2

A novel method and device are described for accurately aligning a substrate comprising a silicon wafer in the fabrication of a silicon vertical junction solar cell, which comprise a base plate having a recess defining an opening for snugly receiving the wafer. The recess includes a substantially straight portion for mating with a cleaved edge of known crystallographic orientation provided on the wafer, and a mask plate for covering the base plate and water. The mask includes a pattern in predetermined configuration through which the wafer may be exposed in the fabrication process for the solar cell. GRA

N86-25051# Aerospace Corp., El Segundo, Calif. Chemistry and Physics Lab.
NICKEL HYDROGEN BATTERY CELL TESTING DATA BASE: AN INDUSTRY AND GOVERNMENT SURVEY
Charles C. Badcock and Martin J. Milden 31 Dec. 1985 21 p
(Contract F04701-85-C-0086)
(AD-A163017; TR-0086(6524-04)-1; SD-TR-85-88) Avail: NTIS HC A02/MF A01 CSCL 10/3

Both government and industry were surveyed to determine the level of testing of nickel hydrogen (NiH2) battery cells and to evaluate the demonstrable capabilities of the couple. Only flight-type cells undergoing ground test were incorporated in the data base; no boilerplate cells or flight batteries were included. Both USAF-design and COMSAT-design cells, as well as a few cells produced by SAFT, were listed. The USAF design is in test in both high and low Earth orbit simulations, whereas the COMSAT design, intended specifically for high-orbit applications, is being tested predominantly in high orbits. The data from over 400 cells show that the reliability and capability of both designs for high-orbit applications are reasonably established out to ten years in geosynchronous orbit, and to approximately 3000 cycles in other high-orbit applications. However, the data base is weak and incomplete for applications of the USAF cell in low Earth orbit. This results from the harsh testing environment to which these cells have been subjected, as well as from various minor design questions that were not resolved when these cells began testing. GRA

N86-25052# Naval Postgraduate School, Monterey, Calif.
A SEAWATER BATTERY MONITOR WITH FIBER OPTIC REMOTE DATA ACQUISITION CAPABILITY M.S. Thesis
Yeon-Deog Koo Dec. 1985 53 p refs
(AD-A164178) Avail: NTIS HC A04/MF A01 CSCL 10/3

This thesis presents the basic design of the system to test the voltage of a 1 volt underwater battery at a long distance by using a fiber optic system. This system contains the voltage-to-frequency converter which converts the voltage of the battery to a variable frequency pulse train, the optical transmitter, the fiber optic receiver, and a frequency-to-voltage converter which converts the variable frequency pulse train not an output voltage. This system has small error but if we use more precise components, we can get more exact result. Additionally, the lifetime of two kinds of batteries were measured by using this circuit. GRA

N86-25053# Oak Ridge National Lab., Tenn.
TESTIMONY OF FRED R. MYNATT, ASSOCIATE DIRECTOR FOR NUCLEAR AND ENGINEERING TECHNOLOGIES, OAK RIDGE NATIONAL LABORATORY, BEFCRE THE SUBCOMMITTEE ON ENERGY RESEARCH AND PRODUCTION OF THE COMMITTEE ON SCIENCE AND TECHNOLOGY, US HOUSE OF REPRESENTATIVES
9 Oct. 1985 8 p
(Contract DE-AC05-84OR-21400)
(DE86-002234; DOE/OR-21400/T204) Avail: NTIS HC A02/MF A01

Space nuclear power technology, current activities at Martin Marietta Energy Systems, future directions of research and development, and proposed recommendations are discussed. B.G.

N86-25054# Stanford Univ., Calif. Dept. of Chemistry.
ENERGY TRANSFER AND PHOTOCHEMISTRY IN BIOMIMETIC SOLAR CONVERSION Annual Report, Oct. 1984 - Sep. 1985
S. G. Boxer 30 Aug. 1985 16 p refs
(Contract GRI-5083-260-0824)
(PB86-142114; GRI-85/0190) Avail: NTIS HC A02/MF A01 CSCL 07E

Photoinduced electron transfer has been studied in a chlorophyllide dimer in which the macrocycles are positioned at 14A separation. Electron transfer between large rigid macrocycles is the initial step in natural photosynthesis, and this dimer attempts to mimic the high quantum thermodynamic efficiencies of this process. The photophysics of these molecules is consistent with rapid, efficient charge separation. The role of the protein medium in facilitating natural photosynthesis is studied using semisynthetic chlorophyll-apomyoglobin complexes. The authors have cloned the gene for human myoglobin and expressed it in high yield in E. coli. Using the technique of site-directed mutagenesis, the authors changed amino acid residues in the vicinity of the heme binding pocket to create novel, structurally characterized, environments for the heme(chlorophyll) macrocycle. DOE

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N86-25055# Commonwealth Scientific and Industrial Research Organization, Mordialoc (Australia). Div. of Atmospheric Research.
DESCRIPTION OF A TWO-DIMENSIONAL ATMOSPHERIC TRANSPORT MODEL
I. G. Enting and J. V. Mansbridge 1986 23 p refs
(DAR-TP-11; ISBN-0-643-04018-8) Avail: NTIS HC A02/MF A01

A description is given of a new two-dimensional atmospheric transport model, suitable for studying atmospheric tracers with relatively long lifetimes. The numerical conventions and input requirements are outlined and a detailed description of the numerical processes is given. Author

N86-25056# Naval Facilities Engineering Command, Washington, D. C. Chesapeake Div.
CENTERVILLE BEACH. PROJECT COMPLETION REPORT
Jul. 1977 63 p refs
(AD-A163461; AD-E401440; CHES/NAVFAC-FPO-1-77(3)) Avail: NTIS HC A04/MF A01 CSCL 13/11

This report describes the development of a unique liquid transfer facility, designed and constructed as a solution for a sewer outfall at Centerville Beach, California. The beach in this area has an active surf zone and a rugged shore terrain that prevented the cost-effective installation of ordinary pipeline materials. To overcome these environmental conditions, ocean engineers selected a 4-inch ID, high-density polyethylene pipe protected by

helically-wrapped, steel-armored wires, and having jute and tar coverings. The use of plastic pipe for liquid transfer is not new, but use of such pipe in the oceans has been limited by its lack of abrasion-resistance and durability. The helically-wound, steel-armored wires provided abrasion resistance, weight, strength, and resistance to pipe collapse. The major conclusion resulting from this project is that the pipeline material and its installation method introduced a new underwater construction capability, one which can be applied to similar projects. GRA

N86-25057# Army Military Personnel Center, Alexandria, Va.
CONTROLLING NONPOINT POLLUTION IN VIRGINIA'S URBANIZING AREAS: AN INSTITUTIONAL PERSPECTIVE M.S. Thesis Final Report
Gordon M. Wells 20 Jan. 1986 170 p refs
(AD-A163693) Avail: NTIS HC A08/MF A01 CSCL 13/2

This paper evaluates the effectiveness of the institutional framework of the Commonwealth of Virginia in the implementation and enforcement of nonpoint source (NPS) pollution control measures in the state's urbanizing areas. The institutional framework is developed primarily around the existing governmental framework. The federal, state and local roles are examined in terms of the relevant legislative and executive NPS control activities already taking place. The judicial function is considered in terms of constitutional guarantees of protection of private property and the potential for liability stemming from the implementation of structural and nonstructural best management practices (BMP's). Three generic categories of BMP's are evaluated in light of this institutional environment: on-site BMP's, off-site BMP's, and nonstructural BMP's. Where they are relevant, various subcategories of the institutional environment are examined: mechanisms and responsibility for financing and maintenance, managing future urban growth and mediating interjurisdictional arrangements. The introduction and first four chapters develop this material and the final chapter is an analysis of the existing state programs (the Erosion and Sediment Control Law and the State Water Control Board's voluntary Urban NPS Control and Abatement Program). The product of this analysis is the conclusion that both state programs are weak due to a lack of adequate state oversight. GRA

N86-25058# Department of Energy, Washington, D. C.
REMOVAL OF SULFUR AND NITROGEN CONTAINING POLLUTANTS FROM DISCHARGE GASES Patent Application
J. I. Joubert, inventor (to DOE) Filed 8 Feb. 1985 15 p Sponsored by DOE
(DE85-017799; US-Patent-Appl-SN-699889) Avail: NTIS HC A02/MF A01

Oxides of sulfur and of nitrogen are removed from waste gases by reaction with an unsupported copper oxide powder to form copper sulfate. The resulting copper sulfate is dissolved in water to effect separation from insoluble mineral ash and dried to form solid copper sulfate pentahydrate. This solid sulfate is thermally decomposed to finely divided copper oxide powder with high specific surface area. The copper oxide powder is recycled into contact with the waste gases requiring cleanup. A reducing gas can be introduced to convert the oxide of nitrogen pollutants to nitrogen. DOE

N86-25059# Los Alamos National Lab., N. Mex.
STRATOSPHERIC TRITIUM SAMPLING Final Progress Report
A. S. Mason and H. G. Oestlund Sep. 1985 9 p
(Contract W-7405-eng-36)
(DE86-004368; LA-10546-PR) Avail: NTIS HC A02/MF A01

Stratospheric tritium sampling was part of Project Airstream (sponsored by the US Department of Energy) between 1975 and 1983. Data from the final deployment in November 1983 are reported here, and the results of the 9 years of effort are summarized. DOE

N86-25060# Research Triangle Inst., Research Triangle Park, N.C.
MODELING TRANSPORT BY CONVECTIVE CLOUDS FOR REGIONAL AIR POLLUTION MODELS
F. M. Vukovich Dec. 1985 8 p
(Contract EPA-68-02-4059)
(PB86-144623; EPA-600/D-86-002) Avail: NTIS HC A02/MF A01 CSCL 04A

A model was developed to account for regional scale vertical transport of pollutants from the mixed layer to the overlying free troposphere by an ensemble of nonprecipitating cumulus convective clouds. The model determines acceptable cloud classes for given atmospheric state represented by the moist static energy distribution. The cloud classes are defined by dry entrainment rate, cloud depth and convective cloud amounts. The clouds are driven by regional scale heat and moisture convergence. Empirical data were collected and used to formulate a closure scheme to obtain the necessary cloud parameters. A statistical model which predicts the vertical distribution of cloud amount from cloud base is developed. The vertical variation of cloud amounts depends on the distribution of clouds with different depths. GRA

N86-25061# National Ocean Service, Anchorage, Alaska. Ocean Assessments Div.
OUTER CONTINENTAL SHELF ENVIRONMENTAL ASSESSMENT PROGRAM. REPORTS OF PRINCIPAL INVESTIGATORS, VOLUME 33 Final Report
Jul. 1985 459 p refs Sponsored by Minerals Management Service
(PB86-134780) Avail: NTIS HC A20/MF A01 CSCL 08C

A compilation of five reports is presented dealing with the distribution and dynamics of heavy metals in Alaskan Shelf environments; characterization of organic matter in sediments; distribution of trace elements in bottom sediment of the Northern Bering Sea; aspects of size distributions, clay mineralogy, and geochemistry of sediments of the Beaufort Sea and adjacent deltas; and the natural distribution and dynamics of hydrocarbons on the Alaskan continental shelf. GRA

N86-25062# Environmental Protection Agency, Research Triangle Park, N.C. Atmospheric Sciences Research Lab.
ATMOSPHERIC MODELING: MODEL AND ACCURACY
K. L. Demerjian Nov. 1985 9 p refs
(PB86-128683; EPA-600/D-85-280) Avail: NTIS HC A02/MF A01 CSCL 07D

The development of models to assess the emission control requirements of primary precursor pollutants in the production of photochemical oxidants has been underway for approximately 20 years. Over the period there has been a considerable increase in our understanding of the basic scientific processes associated with the production of photochemical oxidants in the atmosphere and a concomitant advance in the analytical sophistication by which these processes are incorporated to derive quantitative precursor relationships. The establishment of air quality standards implies the use of such quantitative relationships to describe the link between emissions and air quality in order to consider an effective and cost efficient control program. The paper maps out the progress that has been made in the endeaver, discussing the successes and shortcomings of the present generation of modeling tools. Model performance evaluations, accuracy, uncertainty and sensitivity analyses are also discussed. GRA

N86-25063# National Ocean Service, Anchorage, Alaska. Ocean Assessments Div.
OUTER CONTINENTAL SHELF ENVIRONMENTAL ASSESSMENT PROGRAM: REPORTS OF PRINCIPAL INVESTIGATORS, VOLUME 30
Apr. 1985 631 p refs Sponsored by Minerals Management Service
(PB86-134756) Avail: NTIS HC A99/MF A01 CSCL 08A

A compilation of eight final reports is presented dealing with population and trophics studies of seabirds in the Northern Bering and Chukchi Seas; population estimates and trends of Pribilof Island Seabirds; pelagic distribution of marine birds on the central Bering Sea Shelf; assessment of oil spill risk to birds; and simulation

modeling of marine bird population energetics, food consumption and sensitivity to perturbation. GRA

N86-25064# National Ocean Service, Anchorage, Alaska. Ocean Assessments Div.
OUTER CONTINENTAL SHELF ENVIRONMENTAL ASSESSMENT PROGRAM: REPORTS OF PRINCIPAL INVESTIGATORS, VOLUME 31 Final Report
May 1985 671 p
(PB86-134764) Avail: NTIS HC A99/MF A01 CSCL 08A

Appendices to a report dealing with ecological studies in the Bering Sea region which was prevously published in Volume 2 of the OCSEAP Final Reports series are presented. GRA

N86-25065# National Ocean Service, Anchorage, Alaska. Ocean Assessment Div.
OUTER CONTINENTAL SHELF ENVIRONMENT ASSESSMENT PROGRAM: REPORTS OF PRINCIPAL INVESTIGATORS, VOLUME 32 Final Report
Jun. 1985 523 p refs Sponsored by Minerals Management Service
(PB86-134772) Avail: NTIS HC A22/MF A01 CSCL 08A

This document represents a compilation of four final reports dealing with the infauna of the northeastern Bering and southeastern Chukchi seas. The objectives of this study were: (1) a quantitative inventory of dominant infaunal invertebrates at selected stations in the study areas; (2) a description of spatial distribution patterns of species in the designated study areas; and (3) limited observations of biological interrelationships, emphasizing trophic interactions between selected segments of the benthic biota. Multivariate techniques were employed to examine grouping of stations and taxa in the study areas. Author

N86-25066# Georgia State Univ., Atlanta.
FUNGI AND HYDROCARBONS IN THE MARINE ENVIRONMENT
D. G. Ahearn and S. A. Crow Sep. 1985 12 p refs Sponsored in part by Environmental Research Lab., Gulf Breeze, Fla.
(PB86-109964; EPA-600/D-85-222) Avail: NTIS HC A02/MF A01 CSCL 08A

Hydrocarbons from various sources (anthropogenic pollution, marine seeps, marine algae, atmospheric fallout, and terrestrial runoff) enter the ocean daily. These complex hydrocarbon mixtures are dispersed and degraded by abiotic and biogenic processes. Most commonly, bacteria are considered the primary degraders, with algae and fungi having minor roles. Although implied in a number of cases, the degradation of complex hydrocarbon mixtures by a successional microflora containing temporally isolated populations of bacteria and fungi, was inadequately studied. GRA

N86-25067# Battelle Columbus Labs., Ohio.
AEROSOL BEHAVIOR MODELING. TASK 3: SUPPORT SERVICES FOR RESEARCH AND EVALUATION OF SEVERE ACCIDENT PHENOMENA AND MITIGATION
H. Jordan and V. Kogan Oct. 1985 75 p
(Contract NRC-04-84-127; Grant NRC FIN-B7499)
(TI86-900242; NUREG/cr-4388; BMI-2130) Avail: NTIS HC A04/MF A01

Synergistic modeling of containment atmosphere thermodynamics coupled to steam condensation (evaporation) on (from) wall and particles surfaces was examined. Since wall heat and mass transfer models on containment temperature and pressure were previously analyzed, the influence of steam supersaturation (steam condensation on particles) of wall surface transfer models was addressed. The CONTAIN code treatment of aerosol/thermodynamics coupling was rigorously checked. The QUICKM aerosol behavior code was modified as a reference code for much larger system codes. B.G.

N86-25068# Marine Environmental Sciences Consortium, Dauphin Island, Ala.
THE ECOLOGY OF IRREGULARLY FLOODED SALT MARSHES OF THE NORTHEASTERN GULF OF MEXICO: A COMMUNITY PROFILE
Judy P. Stout Dec. 1984 117 p
(TI86-900237; FWS-OBS-85(7.1)) Avail: NTIS HC A06/MF A01

A good deal of information is available on primary production rates and rates of carbon and mineral loss during in situ decay of aerial plant tissues of dominant species such as Juncus and Spartina alterniflora. Most other plant species are the subject of only one study at a single location along the gulf. Only preliminary data is available on belowground pools of materials, and the technology and methodology to assess the production component is still quite primitive. Mechanisms and forms of export or storage of primary production from marsh plants are poorly understood and existing information is at best variable, if not contradictory. Answers are needed to questions pertaining to detritus utilization and its impact on secondary production; the fate and turnover rate of the nutrients released in decomposition; the impact of meteorological, sedimendary, and geomorphological events on nutrient utilization and accretion; and nutrient translocation between shoots and roots prior to death and decomposition. Author

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N86-25069*# California Inst. of Tech., Pasadena. Seismological Lab.
DYNAMICALLY SUPPORTED GEOID HIGHS OVER HOTSPOTS: OBSERVATION AND THEORY
Mark A. Richards, Bradford Hager, H., and Norman H. Sleep (Stanford Univ., Calif.) 1986 93 p refs Sponsored in part by Sloan Foundation Fellowship
(Grants NAG5-315; NsG-7610)
(NASA-CR-176766; NAS 1.26:176766) Avail: NTIS HC A05/MF A01 CSCL 08G

Hotspots are associated with long wavelength geoid highs, an association that is even stronger when the geoid highs associated with subduction zones are removed. These associations are quantified by expanding the hotspot distribution in spherical harmonics and calculating correlation coefficients as a function of harmonic degree. The hotspot distribution spectrum is essentially white, with peaks at degrees 2 and 6. It is correlated positively with the slab residual geoid for degrees 2 to 6, with low seismic velocity in the lower mantle at degree 2, and with low seismic velocity in the upper mantle at degree 6. A variety of fluid mechanical models were tested for hotspots, including lithospheric delamination and hot plumes, by calculating their predicted dynamic geoid responses and comparing them to the observations. These models include the effects of temperature dependent rheology. The preferred hotspot model, based on observations of the geoid and seismic tomography, has plumes preferentially occurring in regions of large scale background temperature highs in a mantle with substantial viscosity increase with depth, although other models are possible. Author

N86-25070*# Polytechnic Inst. of New York, Farmingdale.
A MORPHOLOGICAL STUDY OF WAVES IN THE THERMOSPHERE USING DE-2 OBSERVATIONS Final Technical Report
Stanley H. Gross, Spencer P. Kuo, and Jerry Shmoys May 1986 57 p refs
(Grant NAG5-479)
(NASA-CR-176775; NAS 1.26:176775; POLY-MRI-1451-86) Avail: NTIS HC A04/MF A01 CSCL 04A

Theoretical model and data analysis of DE-2 observations for determining the correlation between the neutral wave activity and plasma irregularities have been presented. The relationships between the observed structure of the sources, precipitation and

joule heating, and the fluctuations in neutral and plasma parameters are obtained by analyzing two measurements of neutral atmospheric wave activity and plasma irregularities by DE-2 during perigee passes at an altitude on the order of 300 to 350 km over the polar cap. A theoretical model based on thermal nonlinearity (joule heating) to give mode-mode coupling is developed to explore the role of neutral disturbance (winds and gravity waves) on the generation of plasma irregularities. Author

N86-25071# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.

PLASMA OBSERVATIONS IN THE AURORAL AND POLAR CAP REGION

Joseph F. Fennell 15 Dec. 1985 37 p refs
(Contract F04701-85-C-0086)
(AD-A163654; TR-0086(6940-05)-12; SD-TR-85-91) Avail: NTIS HC A03/MF A01 CSCL 04/1

An overview is given of the plasma conditions which obtain throughout much of the auroral region. It covers the diffuse and discrete auroral electron precipitation in the morning and evening oval, cusp, and polar cap. The ionospheric ion outflow throughout the high latitude regime is also described and related to the electron observations. GRA

N86-25072# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.

ELECTRON PRECIPITATION PATTERNS IN THE VICINITY OF A VLF TRANSMITTER

Alfred L. Vampola 15 Dec. 1985 25 p refs
(Contract F04701-85-C-0086)
(AD-A163716; TR-0086(6940-05)-2; SD-TR-85-89) Avail: NTIS HC A02/MF A01 CSCL 04/1

Using high resolution pitch angle measurements made by a magnetic focusing electron spectrometer on the S3-3 satellite, angular distributions of 235 keV electrons precipitated by a ground-based VLF transmitter are compared with the pitch angle distributions that would be produced by various patterns of longitudinal interaction regions. The observed electrons are in the drift loss cone, necessitating the use of a trace-back-to-longitude-of-origin technique coupled with a two-dimensional convolution program describing the response of the electron spectrometer. The data are well-fit with both theoretical calculations of ionospheric field intensity patterns above a transmitter and with a similar pattern of received field intensities measured along a traverse in the conjugate region. The agreement between the data and field patterns implies a linear or quasi-linear wave-particle interaction. The energy-frequency relationship between the electrons and the waves implies an interaction region low on the magnetic field line, perhaps near or at the unperturbed mirror point. GRA

N86-25073# California Univ., Los Angeles. Center for Plasma Physics and Fusion Engineering.

MODIFICATION OF THE IONOSPHERIC ELECTRON VELOCITY DISTRIBUTION FUNCTION DUE TO RESONANT ABSORPTION OF HF WAVES

Merit Shoucri, G. J. Morales, and J. E. Maggs Dec. 1985 44 p
(Contract N00014-75-C-0476)
(AD-A163025; PPG-913) Avail: NTIS HC A03/MF A01 CSCL 04/1

The nonlinear modification of the electron distribution function caused by the interaction with a resonant electrostatic field is studied analytically using a perturbation analysis. This interaction produces tail heating, and for a range of parameter values, can form a bump in the distribution, which leads to emission of secondary waves. These results are applied to the ionosphere's F and upper E regions in the context of ionospheric modification experiments using ground-based powerful HF transmitters. Analogies between these results and experimental measurements are discussed. The purpose of the present work is to calculate the modification in the electron velocity distribution function resulting from the resonant excitation of electrostatic oscillations in the ionosphere. It is hoped that the analytic results may help illuminate some of the various experimentally observed phenomena, and perhaps suggest new experiments which would probe the nature of the electron acceleration mechanisms. GRA

N86-25074# Iowa Univ., Iowa City. Dept. of Physics and Astronomy.

A PLASMA WAVE INSTRUMENT ON THE AMPTE/IRM (ACTIVE MAGNETOSPHERIC PARTICLE TRACING EXPLORERS/ION RELEASE MODULE) SPACECRAFT Annual Letter Report, 1 Dec. 1984 - 30 Nov. 1985

30 Nov. 1985 5 p
(Contract N00014-82-K-0183)
(AD-A163048) Avail: NTIS HC A02/MF A01 CSCL 04/1

The primary purposes of the Active Magnetospheric Particle Tracing Explorers (AMPTE) program were: (1) to carry out the release and monitoring of lithium and barium ions in the solar wind and within the distant magnetosphere in order to study the access of solar wind ions to the magnetosphere, the convective-diffusive transport and energization of magnetospheric particles, and the instabilities and wave-particle interactions associated with the release and the subsequent evolution of the injected clouds; and (2) to generate massive release of barium in the dawn and dusk magnetosheath in order to create visible artificial comets in the flowing solar wind plasma within which studies of diamagnetic effects, ionization, momentum exchange, ion transport, and visible phenomena could be made. GRA

N86-25075# Duke Univ., Durham, N. C.

MOLECULAR ABSORPTION OF ATMOSPHERIC SPECIES Final Report, 7 May 1984 - 1 Sep. 1985

Frank C. DeLucia 17 Dec. 1985 14 p refs
(Contract DAAG29-84-K-0073)
(AD-A164024; ARO-21756.1-PH) Avail: NTIS HC A02/MF A01 CSCL 04/1

The propagation of microwaves and millimeterwaves through the disturbed atmosphere is affected by molecular absorption that can be significantly different than the absorption in the ambient atmosphere. This is due to two factors. First, the constituents of the ambient atmosphere will exhibit significantly different electromagnetic properties at elevated temperatures. Second, many additional species that are strong absorbers of microwaves, such as HNO3, HNO2, O3, NO2, H202, OH, and N20, are present in the disturbed atmosphere. This work addressed both of these issues. A preliminary version of a code that utilized the previously available molecular data base was written in a form that would be compatible with NORSE. This code was turned over to PRi (the keeper of the NORSE code) and is currently being integrated into it. In addition, measurements to 1000K were made on one transition of H20 as a check on the extrapolation to higher temperature that was used in this code. GRA

N86-25076# National Academy of Sciences - National Research Council, Washington, D. C.

EARTH SCIENCE INVESTIGATIONS IN THE UNITED STATES ANTARCTIC RESEARCH PROGRAM (USARP) FOR THE PERIOD JULY 1, 1984 - JUNE 30, 1985

1985 87 p Sponsored in part by the National Science Foundation, Washington, D.C.
(Grant NSF DPP-82-07098)
(PB86-143773) Avail: NTIS HC A05/MF A01 CSCL 08G

A listing of earth science research activities was conducted as part of the U.S. Antarctic Research Program for the year July 1, 1984, through June 30, 1985. Publications resulting from the research are also listed. Information was obtained by a survey of participants in the U.S. Antarctic Program, with respondents providing the data on their work in camera-ready format. GRA

N86-25077# Los Alamos National Lab., N. Mex.

MONTE CARLO SIMULATION OF TWO-PARTICLE RELATIVE DIFFUSION USING EULERIAN STATISTICS: EXTENDED ABSTRACT

J. T. Lee, G. L. Stone, R. E. Lawson, and M. Shipman Oct. 1985 8 p refs Sponsored in part by EPA, Research Triangle Park, N.C. Prepared in cooperation with Northrop Services, Inc., Research

Triangle Park, N.C.
(PB86-116548; EPA-600/D-85-231) Avail: NTIS HC A02/MF A01 CSCL 04A

A Monte Carlo technique for the simulation of two-particle relative diffusion is developed using the Eulerian statistical properties of the turbulence. Numerical results are presented which clarify the role of interparticle velocity correlations and reveal the importance of an Eulerian parameter that is not present in Lagrangian theories of relative diffusion. Data on the absolute diffusion and meandering of a plume in a field of grid-generated wind tunnel turbulence are presented. These data are in agreement with the Monte Carlo simulations. GRA

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N86-25078*# Colorado Univ., Boulder. Cooperative Inst. for Res. in Environ. Studies.
EMPIRICAL AND MODELED SYNOPTIC CLOUD CLIMATOLOGY OF THE ARCTIC OCEAN Final Report
Roger G. Barry, J. P. Newell, A. Schweiger, and Robert G. Crane (Pennsylvania State Univ., State College) Apr. 1986 104 p refs (Grant NAG5-417)
(NASA-CR-176752; NAS 1.26:176752) Avail: NTIS HC A06/MF A01 CSCL 04B

A set of cloud cover data were developed for the Arctic during the climatically important spring/early summer transition months. Parallel with the determination of mean monthly cloud conditions, data for different synoptic pressure patterns were also composited as a means of evaluating the role of synoptic variability on Arctic cloud regimes. In order to carry out this analysis, a synoptic classification scheme was developed for the Arctic using an objective typing procedure. A second major objective was to analyze model output of pressure fields and cloud parameters from a control run of the Goddard Institue for Space Studies climate model for the same area and to intercompare the synoptic climatatology of the model with that based on the observational data. B.G.

N86-25079# Naval Research Lab., Washington, D. C.
AN ASSESSMENT OF DATA QUALITY AND QUANTITY FROM AIRBORNE CLOUD PHYSICS PROJECTS FROM 1974 THROUGH 1984 Final Report, Apr. 1983 - Dec. 1984
Richard K. Jeck Dec. 1985 144 p refs
(Contract DTFA03-83-A-00309)
(DOT/FAA/CT-85/37; NRL-8951) Avail: NTIS HC A07/MF A01

Airborne cloud physics projects are reviewed to assess the quantity, quality, and availability of microphysical data from clouds above the freezing level. In particular, available information is analyzed to determine whether adequate data on supercooled liquid water content (SLWC) and snow currently exist for reliably characterizing aircraft icing conditions at altitudes up to 30,000 feet over the conterminous United States (CONUS). About 1700 flights in cold clouds over CONUS are documented, and the number and value of flights having data on SLWC, snow and other hydrometeors are tabulated. B.G.

N86-25080# Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
FORECAST OF ATLANTIC SEASONAL HURRICANE ACTIVITY FOR 1986
William M. Gray 29 May 1986 24 p refs Sponsored in part by NSF
Avail: NTIS HC A02/MF A01

Forecasting of tropical cyclone activity which might occur in the Atlantic Ocean region (including the Caribbean Sea and the Gulf of Mexico) in 1986 is discussed. Research relates seasonal activity to four factors: the El Nino; the Quasi-Biennial Oscillation of the equatorial stratospheric wind; Caribbean Basin and Gulf of Mexico sea level pressure anomaly; and lower latitude Caribbean Basin 200 mb zonal wind anomaly in June and July. A brief background description of the methodology of the forecasting scheme and verification information on the 1984 and 1985 seasons are also given. B.G.

N86-25081# Army Electronics Research and Development Command, White Sands Missile Range, N. Mex. Atmospheric Sciences Lab.
THE BEHAVIOR OF CLOUD DROPLETS IN AN ACOUSTIC FIELD: A NUMERICAL INVESTIGATION
Michael P. Foster Aug. 1985 107 p refs
(AD-A163704; ERADCOM/ASL-TR-0181) Avail: NTIS HC A06/MF A01 CSCL 04/2

The theory and practice of acoustic agglomeration have been evolving steadily including advances in fields such as pollution control using the principles of acoustic agglomeration. With respect to the field of meteorology, there have been attempts in the past to modify atmospheric fogs using intense acoustic energy. These efforts enjoyed only mixed success and were abandoned. However, the theory of acoustic agglomeration suggests that clouds with higher liquid water contents and greater number concentrations than fogs may be more sensitive to acoustic waves and may undergo significant changes in their spectra when acoustic energy is propagated through them. Thus, the application of the principles of acoustic agglomeration to the study of atmospheric phenomena may provide insight to the effect of thunder on cloud and precipitation processes as well as providing the basis for a new technology in weather modification. In this thesis the theory of acoustic agglomeration is described and a one-droplet model is developed to study the effects of acoustic waves on cloud droplets. A stochastic model used to predict changes in cloud droplet spectra due to gravitational sedimentation is modified to simulate the application of acoustic energy to various cloud volumes. The results are discussed and suggestions are made for further study of the phenomenon. GRA

N86-25082# Naval Postgraduate School, Monterey, Calif.
EVALUATION OF NOGAPS 2.1 (NAVY OPERATIONAL GLOBAL ATMOSPHERIC PREDICTION SYSTEM 2.1) SYSTEMATIC ERROR - WINTER 1983 - 1984
James S. Boyle and Carlyle H. Wash Nov. 1985 74 p refs
(AD-A163812; NPS63-85-002) Avail: NTIS HC A04/MF A01 CSCL 04/2

An evaluation of the systematic error of the Navy Operational Global Atmospheric Prediction System (NOGAPS 2.1) for the winter of 1983 to 1984 is given. The systematic error is just the mean of the forecast error. The error is the difference between the NOGAPS forecast and the NOGAPS analysis at verification time. The fields examined are the 9235, 500 and 250 mb heights, the 925 and 250 mb winds, the 925-500 mb thickness and sea-level pressure. The forecasts are those started on the 0000 GMT watch for 120 h and are evaluated at intervals of 24 hours. The error and analysis fields are also fourier decomposed along latitude circles to ascertain the scale structure of the errors. In addition, anomaly correlations and root mean square error are computed over various latitude bands to provide an overview of the model performance. GRA

N86-25083# SRI International Corp., Menlo Park, Calif.
A MODEL OF AIRFLOW AND DIFFUSION IN COMPLEX TERRAIN (MADICT)
F. L. Ludwig Nov. 1985 172 p refs
(Contract DAAG29-83-K-0009)
(AD-A163819; ARO-19630.5-GS) Avail: NTIS HC A08/MF A01 CSCL 04/2

A model of transport and diffusion during time- and space-varying meteorological conditions is described, along with relevant supporting theory. The model calculates 3-dimensional wind fields in complex terrain from limited observational input. Superposition of previously calculated mass-conserving wind field solutions is used to keep the required calculations to a minimum. Limited discussions of the required wind calculations are included, along with listings of applicable computer codes. The transport and diffusion module uses puffs to simulate continuous plume behavior.

Techniques are described for minimizing the required calculations. The report includes complete user instructions, a FORTRAN77 computer code and two sample problems for the transport and diffusion model. GRA

N86-25084# Naval Postgraduate School, Monterey, Calif.
SATELLITE CLOUD AND PRECIPITATION ANALYSIS USING A MINICOMPUTER Technical Report, Oct. 1983 - Oct. 1985
Carlyle H. Wash, Laura A. Spray, and Lang C. Chou Nov. 1985 94 p refs
(AD-A163821; NPS63-85-003) Avail: NTIS HC A05/MF A01 CSCL 04/2

A satellite-derived cloud and precipitation analysis program has been developed for an interactive mini-computer system. The program utilizes geostationary infrared and visual data with operational upper air and surface temperature analyses to specify cloud-type, cloud amount, cloud-top temperature, cloud-top height and estimated precipitation intensity. Five cases of GOES-East data (2 x 2 n mi visual and 2 x 4 n mi infrared) for an approximately 1600 x 1600 n mi area over the eastern United States and western North Atlantic Ocean are used in evaluating the model's performance. Each satellite-derived, cloud and precipitation analysis is evaluated subjectively, using conventional synoptic data, radar measurements and manual nephanalysis for verification, and objectively, using surface synoptic observations for verification. Successful estimates of cloud amount for overcast and clear skies were obtained; however, broken and scattered conditions were underestimated. The majority of stratiform cloud types and multi-layered clouds were analyzed correctly by the model. Classification errors occurred with cumuliform clouds and thin cirrus. Reasonable precipitation intensity and cloud-top temperature/height analyses were produced by the NPS model. GRA

N86-25085# Jackson State Univ., Miss.
DIAGNOSTIC STUDY OF ATMOSPHERE-TERRAIN INTERACTION LEADING TO THE FORMATION OF DUST CLOUDS AND POOR VISIBILITIES OVER THE NEAR EAST DESERT AREAS Final Report, 24 May 1982 - 31 Oct. 1985
Pieter J. Feteris 30 Sep. 1985 23 p refs
(Grant DAAG29-82-G-0110)
(AD-A163890; ARO-19612.1-GS-H) Avail: NTIS HC A02/MF A01 CSCL 04/2

To compare the frequency of occurrence of poor visibilities in areas and during periods of intense agricultural, industrial and military activity with that in sparsely populated areas unaffected by war and military maneuvers, three years of surface reports from 850 stations in the Near East and adjacent North Africa were screened for visibilities coded as 90 through 95 and 9 through 10. Seasonal maps of the locations of stations reporting poor visibilities, a calendar of poor visibility for each station and maps of the distribution of those stations reporting fog rain, fog/snow/drifting snow and sand/dust were prepared for most of the three year period. Only the most reliable and important results are shown. In mountainous regions poor visibilities occurred frequently all year round. Low frequencies of poor visibility reports were found in Eastern Tunesia, Western Lybia, West Africa and the Sudan. GRA

N86-25086# Naval Postgraduate School, Monterey, Calif.
APPLICATIONS OF WIND EMPIRICAL ORTHOGONAL FUNCTIONS IN TROPICAL CYCLONE MOTION STUDIES M.S. Thesis
Thomas B. Schott Dec. 1985 100 p refs
(AD-A164170; AD-E750890) Avail: NTIS HC A05/MF A01 CSCL 04/2

An empirical orthogonal function (EOF) analysis is used to represent environmental wind fields associated with selected western North Pacific tropical cyclones from 1979 to 1983. Composite synoptic patterns within five past-motion categories of cyclones are studied using 5, 10, 20 and 35 EOF modes. Significant differences in the composite fields are found between categories, which suggests that the wind EOFs are capable of representing synoptic patterns associated with tropical cyclone motion. Regression equations are developed to postprocess the forecast track of the One-way Tropical Cyclone Model (OTCM). The predictors for the regression analysis include the EOF coefficients, past motion, storm position, date, intensity, backward extrapolation and forward track displacements. For the dependent sample, the mean 72-h track forecast error for the modified OTCM is 383 km, which represents a 210 km improvement relative to the unmodified OTCM. Thus, the regression scheme has great potential for operational application. Author (GRA)

N86-25087# Oregon Graduate Center for Study and Research, Beaverton.
REMOTE SENSING OF ATMOSPHERIC WINDS BY UTILIZING SPECKLE-TURBULENCE INTERACTION AND OPTICAL HETERODYNE DETECTION Final Report, 1 Jun. 1983 - 30 Sep. 1985
J. F. Holmes and V. S. R. Gudimetla 21 Nov. 1985 59 p refs
(Contract DAAG29-83-K-0077)
(AD-A164187; ARO-20218.2-GS) Avail: NTIS HC A04/MF A01 CSCL 04/2

Speckle turbulence interaction has the potential for allowing single ended remote sensing of the path averaged vector crosswind in a plane perpendicular to the line of sight to a target. If a laser transmitter is used to illuminate a target, the resultant speckle field generated by the target is randomly perturbed by the atmospheric turbulence as it propagates back to the location of the transmitter-receiver. When a crosswind is present, this scintillation pattern will move with time across the receiver aperture; and consequently, the time delayed statistics of the speckle field at the receiver are dependent on the crosswind velocity. A continuous wave laser transmitter of modest power level (a watt or two) in conjunction with optical heterodyne detection has been used to exploit the speckle-turbulence interaction and measure the crosswind. The use of a CW transmitter at 10.6 microns and optical heterodyne detection has many advantages over direct detection and a double pulsed source in the visible or near infrared. These advantages include the availability of compact, reliable and inexpensive transmitters; better penetration of smoke, dust and fog; stable output power; low beam pointing jitter; and considerably reduced complexity in the receiver electronics. In addition, with a CW transmitter, options exist for processing the received signals for the crosswind that do not require a knowledge of the strength of turbulence. GRA

N86-25088# National Oceanic and Atmospheric Administration, Washington, D. C. National Environ. Satellite, Data and Info. Svc.
MARINERS WEATHER LOG, VOLUME 29, NUMBER 4, FALL 1985
1985 71 p
(PB86-142072) Avail: NTIS HC A04/MF A01 CSCL 04B

A mariner's weather log is presented. Topics include: (1) genesis of Atlantic lows experiment; (2) Western North Pacific typhoons, 1984; (3) North Indian Ocean tropical cyclones, 1984; (4) central North Pacific tropical cyclones,1984; (5) marine observations program; (6) tips to the radio officer; and (7) marine weather review for April, May, and June, 1985. GRA

N86-25089# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Natural Disasters.
LOS ANGELES, CALIFORNIA TORNADO OF MARCH 1, 1983
1985 50 p
(Grants NSF CEE-82-19358; NSF CEE-84-13362)
(PB86-141991; CETS-CND-024) Avail: NTIS HC A03/MF A01 CSCL 04B

The March 1, 1983, downtown metropolitan area of Los Angeles tornado is discussed. The path of the tornado moved in approximately a south to north direction and passed within a quarter mile of major highrise buildings. Due to the lack of historical tornadoes in the area and the absence of the typical meteorological events preceeding a midwestern tornado, the National Weather Service did not issue a tornado watch. The meteorological situation before and after the tornado is summarized, the observed structural damage to buildings and lifelines are discussed, and the emergency

planning and preparedness for such an event in the City of Los Angeles are examined. GRA

N86-25090# National Weather Service, Washington, D.C. Climate Analysis Center.
MONTHLY AND SEASONAL WEATHER OUTLOOK FOR MID-NOVEMBER TO MID-DECEMBER 1985, VOLUME 39, NUMBER 22, NOVEMBER 14, 1985
14 Nov. 1985 10 p
(PB86-128097) Avail: NTIS HC A02/MF A01 CSCL 04B
Temperature and precipitation probabilities for the Northern Hemisphere are given on a periodic and seasonal basis. GRA

N86-25091# National Weather Service, Washington, D.C. Climate Analysis Center.
MONTHLY AND SEASONAL WEATHER OUTLOOK FOR MID-DECEMBER 1985 TO MID-JANUARY 1986, VOLUME 39, NUMBER 24, DECEMBER 14, 1985
14 Dec. 1985 10 p
(PB86-142262) Avail: NTIS HC A02/MF A01 CSCL 04B
Precipitation and temperature probabilities are presented for the Northern Hemisphere on a periodic and seasonal basis. GRA

N86-25092# National Weather Service, Washington, D.C. Climate Analysis Center.
MONTHLY AND SEASONAL WEATHER OUTLOOK FOR JANUARY 1986, VOLUME 40, NUMBER 1, DECEMBER 31, 1985
31 Dec. 1985 10 p
(PB86-142270) Avail: NTIS HC A02/MF A01 CSCL 04B
Temperature and precipitation probabilities are given for the Northern Hemisphere on a periodic and seasonal basis. GRA

N86-25093# National Weather Service, Washington, D.C. Climate Analysis Center.
MONTHLY AND SEASONAL WEATHER OUTLOOK FOR MID-JANUARY TO MID-FEBRUARY 1986, VOLUME 40, NUMBER 2, JANUARY 14, 1986
14 Jan. 1986 10 p
(PB86-145828) Avail: NTIS HC A02/MF A01 CSCL 04B
The report gives temperature and precipitation probabilities for the Northern Hemisphere on a periodic and seasonal basis. GRA

N86-25094# National Weather Service, Fort Worth, Tex.
NATIONAL WEATHER SERVICE (NWS) SOUTHERN REGION QPF (QUANTITATIVE PRECIPITATION FORECASTING) WORKSHOP
Apr. 1985 120 p Workshop held in San Antonio, Tex., 28-30 Jan. 1985
(PB85-199164; NOAA-TM-NWS-SR-112) Avail: NTIS HC A06/MF A01 CSCL 04B
This Technical Memorandum and the workshop it summarizes, marks a milestone in Quantitative Precipitation Forecasting (QPF). Although a national QPF program has existed for many years, field forecasters in the late 1970's recognized the need to develop localized QPF techniques to enhance national products and improve local forecast and warning services. The initial emphasis appears to have begun at WSFO Lubbock because of unique terrain, data void problems, and hydrological and meteorological responsibilities along the international river boundary, the Rio Grande. The success of the program and the relocation of some of the originators of the Lubbock QPF program opened opportunities to expand the effort. Author

N86-25095# National Oceanic and Atmospheric Administration, Princeton, N.J. Geophysical Fluid Dynamics Lab.
GEOPHYSICAL FLUID DYNAMICS LABORATORY ACTIVITIES FY 1985, PLANS FY 1986
Sep. 1985 178 p
(PB86-113545) Avail: NTIS HC A09/MF A01 CSCL 04B
A summary of the work accomplished at the Geophysical Fluid Dynamics Laboratory (GFDL) and the near future direction of research plans are given. The major research areas that correspond to NOAA's mission in oceanography and meteorology which include weather service; climate; atmospheric quality; marine quality; and ocean service are discussed. Goals, recent achievements and future plans for climate dynamics, middle atmosphere dynamics and chemistry, experimental prediction, oceanic circulation, planetary circulations, observational studies, hurricane dynamics, mesoscale dynamics, and convection and turbulence are discussed. GRA

N86-25096# National Center for Atmospheric Research, Boulder, Colo.
CLIMATE SENSITIVITY OF A NUMERICAL MODEL OF ICE-SHEET DYNAMICS AND THERMODYNAMICS Ph.D. Thesis
B. H. Hanson 1985 205 p Prepared in cooperation with Minnesota Univ., Minneapolis
(Grant NSF ATM-82-17015)
(PB86-119617; NCAR/CT-91) Avail: NTIS HC A10/MF A01 CSCL 08L
The climate of the Earth is a complex of interacting parts, of which ice sheets vary most slowly. Ice sheets have been coupled to climate only in the simplest models because of the great differences in the time scales of their responses, and because the models previously used for ice sheets have had limited physical capabilities in their responses to climatic influences. A finite-element model developed here responds realistically to climatic forcing. The model uses the method of weighted residuals to solve the general equations for steady motion of a nonlinear viscous medium and for energy conservation with forced advection, internally generated heat, and diffusion in a two-dimensional, vertical flow-plane. A number of experiments using the finite-element simulated a flowplane on the south dome of Barnes Ice Cap on Baffin Island. Shear stresses play the major role in the stress balance. GRA

N86-25097 Washington Univ., Seattle.
A ONE-LEVEL MESOSCALE MODEL FOR DIAGNOSING SURFACE WINDS IN MOUNTAINOUS AND COASTAL REGIONS Ph.D. Thesis
David Prescott Dempsey 1985 199 p
Avail: Univ. Microfilms Order No. DA8529897
A one-level mesoscale model (Mesmod) for diagnosing surface winds in complex terrain was developed. Mesmod explicitly solves momentum and temperature tendency equations in pressure-sigma coordinates only at the surface. Under the hydrostatic assumption, the vertically-integrated temperature profile determines the surface pressure. Mesmod parameterizes friction, subgrid-scale horizontal diffusion, and diabatic heating/cooling. Mesmod is integrated from an initially unbalanced state to a nearly steady state without diabatic forcing, and is then integrated, driven by a specified, time-dependent diabatic heating or cooling term. At internal Froude numbers Mesmod approximately reproduces the surface pressure pattern normally associated with gravity waves in flow past three-dimensional topography. Mesmod shows that rotation and nonlinear advection can create a line of convergence downstream of isolated, mesoscale mountains. Mesmod reproduces pronounced lines of convergence observed in three of the cases downwind of the Olympic Mts., an isolated mesoscale mountain range. Dissert. Abstr.

N86-25098 Colorado Univ., Boulder.
A DIAGNOSTIC ANALYSIS OF THE PYRENEES LEE WAVE EVENT OF 21-23 MARCH 1982 Ph.D. Thesis
Karl William Cox 1985 192 p
Avail: Univ. Microfilms Order No. DA8528472
Synoptic and instrumented aircraft data, obtained during the Alpine Experiment (ALPEX) of the Global Atmospheric Research Program, for the 21 to 23 March 1982 lee wave event that occurred in northerly flow over the Pyrenees were analyzed. It is indicated that a vertically propagating mountain wave was present above the Pyrenees ridge, with partially trapped lee waves extending downstream and exhibiting a slight three-dimensionality. Analysis of this event is supplemented by use of model calculations. Scorer's model of two-dimensional, inviscid, steady-state flow over a mountain ridge is adopted, while a continuous variation in the vertical atmospheric structure is retained. The actual topography

is employed, and low-level blocking of the airstream on the windward side of the Pyrenees are considered in the lower boundary condition. The diagnostic model captures the low-level trapped wave response on 21 March, but the horizontal wavelength is slightly underestimated when condensation effects are neglected. The model indicates that strongly trapped lee waves probably persisted through 22 March, evolving to the observed pattern of partially trapped waves on 23 March as a result of a decrease in the northerly wind speed in the middle and upper troposphere. The results of an analysis of synoptic and instrumented aircraft data, obtained during the model derived estimates of the vertical flux of horizontal momentum are provided for each day of this event. Dissert. Abstr.

N86-25099# Geological Survey, Reston, Va.
REMOTE MONITORING OF PROCESSES THAT SHAPE DESERT SURFACES: THE DESERT WINDS PROJECT
J. F. McCauley, C. S. Breed, P. J. Helm, G. H. Billingsley, D. J. MacKinnon, M. J. Grolier, and C. K. McCauley (Museum of Northern Arizona, Flagstaff) 1985 23 p refs
(TI86-900108; USGS-BULL-1634; LC-84-601115) Avail: NTIS HC A02/MF A01

Investigations of wind as a geologic agent have been hampered by a scarcity of long-term onsite measurements of wind velocity (including peak gusts, direction, and periodicity), precipitation frequency and intensity, relative humidity, and soil and air temperatures in key desert localities. A new long-term study, using data obtained by meteorologic and geologic sensors coupled to nonattended solar-powered data-collector platforms is described. Data obtained from these geometeorologic (Geomet) stations in desert type areas of Arizona are automatically relayed by the Geostationary Operational Environmental Satellite (GOES) to the U.S. Geological survey in Flagstaff, Ariz., in real time, and converted to graphic form. Preliminary computer analysis of the data indicates strikingly different meteorologic patterns that control, in great part, the local surficial geology of different desert areas. Author

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N86-25100*# Applied Science Associates, Inc., Apex, N.C.
STUDIES RELATED TO OCEAN DYNAMICS. TASK 3.2: AIRCRAFT FIELD TEST PROGRAM TO INVESTIGATE THE ABILITY OF REMOTE SENSING METHODS TO MEASURE CURRENT/WIND-WAVE INTERACTIONS Final Report
N. E. Huang, W. A. Flood, and G. S. Brown May 1975 74 p refs
(Contract NAS6-2520)
(NASA-CR-168349; NAS 1.26:168439) Avail: NTIS HC A04/MF A01 CSCL 08C

The feasibility of remote sensing of current flows in the ocean and the remote sensing of ocean currents by backscattering cross section techniques was studied. It was established that for capillary waves, small scale currents could be accurately measured through observation of wave kinematics. Drastic modifications of waves by changing currents were noted. The development of new methods for the measurement of capillary waves are discussed. Improvement methods to resolve data processing problems are suggested. E.A.K.

N86-25101# California Univ., Santa Cruz.
PHYSICAL OCEANOGRAPHIC DATA MARGINAL ICE ZONE EXPERIMENT R/V POLAR QUEEN, JUNE-JULY 1984 Final Report
Theodore D. Foster, Bruce S. McNamara, T. M. Bandurraga, and Eric G. Eckert 30 Dec. 1985 170 p refs
(Contract N00014-84-K-0144)
(AD-A163591) Avail: NTIS HC A08/MF A01 CSCL 08/12

This report contains temperature and salinity profiles taken from the R/V POLAR QUEEN in the nothern Greenland Sea during the Marginal Ice Zone Experiment in June and July 1984. These data were obtained with a Neil Brown Mark III CTD about once a day while the ship was moored to ice floes and drifting. GRA

N86-25102# Woods Hole Oceanographic Institution, Mass.
CURRENT VARIABILITY NEAR THE SOUTHEAST NEWFOUNDLAND RIDGE
N. P. Fofonoff and R. M. Hendry Jul. 1985 25 p refs
(Contract N00014-76-C-0197)
(AD-A163644; WHOI-CONTRIB-5593) Avail: NTIS HC A02/MF A01 CSCL 08/3

A cooperative moored array experiment measured currents and temperatures in the vicinity of the Southeast Newfoundland Ridge over a 14 month period. Measurements were obtained from an incoherent exploratory array of nine moorings instrumented at 500, 800, 1500 and 4000 m levels. The objectives were to explore the amplitude, spatial variability and time scales of the eddy field in the decay region of the Gulf Stream. An additional experiment to examine the influx of Norwegian Sea overflow water into the western North Atlantic Basin was imbedded in the array. Supplementary CTD and XBT profiles and a single current profile were taken during deployment and recovery cruises to aid in interpretation of the moored measurements and identification of water masses. Mean velocities were weak compared with rms eddy velocities and were not determined with statistical significance at many locations. Maximum daily-averaged speeds ranged from 0.3 to 0.6 m/s at 500 m and 0.09 to 0.3 m/s at 4000 m. Eddy kinetic energies at 500 m ranged from 0.034 J/kg near the ridge to 0.005 J/kg in the southeastern corner of the array. Deep energies were reduced by a factor of 4 to 12 with the 4000 m level showing bottom intensification at most locations. Topographic effects were noted in the orientation of eddy velocities and reduction of low-frequency components near the Ridge. The eddy field showed no clear-cut evidence of wavelike propagation of advection in streamfunction plots. GRA

N86-25103# Woods Hole Oceanographic Institution, Mass.
A COMPILATION OF MOORED CURRENT METER AND WIND RECORDER DATA. VOLUME 38. LONG-TERM UPPER OCEAN STUDY (LOTUS) (MOORINGS 787, 788, 789, 790, 792), APRIL 1983 - MAY 1984
Susan A. Tarbell, Ellyn T. Montgomery, and Melbourne G. Briscoe Dec. 1985 167 p refs
(Contracts N00014-76-C-0197; N00014-84-C-0134)
(AD-A163897; WHOI-85-39) Avail: NTIS HC A08/MF A01 CSCL 08/3

The Long-Term Upper Ocean Study (LOTUS) was a two-year field experiment near 34 deg N 70 deg W designed to acquire a continuous set of measurements of currents and temperatures in the upper, open ocean together with local hydrography meteorology, and mesoscale oceanographic features. The first scientific moorings were deployed in May 1982. The first year of mooring data from May 1982 to April 1983 is presented by Tarbell, Pennington and Briscoe (1984 W.H.O.I. Tech. Rept. 84-36). The second year of mooring data, from April 1983 to May 1984, when the final mooring recovery occurred, is presented here. GRA

N86-25104# Hawaii Inst. of Geophysics, Honolulu.
MONTHLY MAPS OF SEA LEVEL ANOMALIES IN THE PACIFIC, 1975-1981. REPORT ON THE IGOSS (INTEGRATED GLOBAL OCEAN SERVICES SYSTEM) SEA LEVEL PILOT PROJECT
Klaus Wyrtki and Shikiko Nakahara Aug. 1984 96 p
(Grant NA80RA-H-00002)
(AD-A163061; HIG-84-3; JIMAR-84-0085) Avail: NTIS HC A05/MF A01 CSCL 08/3

Sea level data obtained on islands in the tropical and subtropical Pacific Ocean are used to compile maps of the sea level anomaly for each month of the period January 1975 to December 1981. The maps reveal the large horizontal coherence of sea level anomalies with space scales of several thousand kilometers. Coherence scales are larger in the east-west than in the north-south

direction. The anomalies are also coherent over many months indicating a dominance of low-frequency variations. GRA

N86-25105# Texas A&M Univ., College Station. Ocean Engineering Program.
NONPARAMETRIC AND PARAMETRIC ESTIMATION OF WAVE STATISTICS AND SPECTRA
H. Yamazaki and J. B. Herbich Oct. 1985 189 p refs Sponsored in part by NOAA, Rockville, Md.
(Grant NA83AA-D-00061)
(PB86-141967; COE-279; TAMU-SG-86-202) Avail: NTIS HC A09/MF A01 CSCL 08C

A nonparametric bivariate density estimation technique is developed employing tensor product B-splines to provide a concise wave data summary. Most of the existing nonparametric techniques involve a certain level of subjectivity in the choice of smoothing parameters. A criterion based on the least squares concept is proposed to remove the subjective choice of smoothing parameters. An alternative spectral estimation procedure is proposed. The alternative spectrum is the second moment of the wave height of the joint probability density function (pdf) in terms of the frequency domain, and is named the PDF spectra. The nonparametric joint pdf provides a concise representation of long-term wave data from which one can obtain not only the usual wave statistics, but the wave spectra as well. That is, the wave spectrum is simply a subset statistical function contained in the bivariate pdf for wave height and period. GRA

N86-25106# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
MANAGEMENT INFORMATION (WAVE PROPAGATION LABORATORY, BOULDER, COLORADO)
Oct. 1985 50 p
(PB86-139524) Avail: NTIS HC A03/MF A01 CSCL 08C

The nation's geophysical research and service is to be improved through creation and application of new remote measurement systems. Essential functions include: Wave propagation studies; Technique development; Atmospheric and Oceanic research; Technology transfer. GRA

N86-25107 State Univ. of New York, Stony Brook.
ON STRATIFICATION AND WIND-INDUCED MIXING IN THE CHESAPEAKE BAY Ph.D. Thesis
David Milliken Goodrich 1985 148 p
Avail: Univ. Microfilms Order No. DA8527473

Seasonal stratification in Chesapeake Bay is analyzed using multiyear time series of salinity and velocity from moored current meter arrays. In the mid-Bay region, the fall-winter period is characterized by wind induced destratification events followed by rapid restratification. In spring, a stable pycnocline is established. In early fall, surface cooling causes a temperature inversion which reduces the vertical density gradient by about 20%, destratification then occurs during strong wind events that generally occur in late September. Wind-induced mixing is neither local nor confined to surface waters. A homogeneous water column persisted during a one month period for at least one of these stations. The mechanism of wind-induced destratification in the mid-Bay region is associated with the generation of internal velocity shear. Following mixing, frictional coupling of surface and bottom water is increased and internal shear is reduced. Wind over a stratified water column generates flow response which is depth dependent. When the water column is well mixed, both surface and bottom water are frictionally coupled to the wind, and response to wind is depth-independent. Locally and nonlocally forced transport through the Bay entrance is shown to cause large subtidal variability in salinity. Dissert. Abstr.

N86-25108 Washington Univ., Seattle.
NEAR-INERTIAL WAVE PROPAGATION IN GEOSTROPHIC SHEAR Ph.D. Thesis
Eric L. Kunze 1985 102 p
Avail: Univ. Microfilms Order No. DA8529918

Near-inertial and geostrophic motions have similar horizontal scales in the ocean. This implies that interaction terms involving mean flow shear of the form (v x nabla (V)) as well as the mean flow itself (v x nabla (v)) must be retained in the equations of motion. An approximate dispersion relation for near-inertial internal waves propagating in geostrophic shear is formulated that includes straining by the mean flow shear. Under these conditions, the geostrophic vorticity zeta shifts the lower bond of the internal waveband from the planetary value of the Coriolis frequency f to an effective Coriolis frequency f sub eff = f + zeta/2. A ray tracing approach is adopted to examine the propagation behavior of near-inertial waves in a model geostrophic jet. Trapping and critical-layer amplification are found to occur in regions of negative vorticity where a near-inertial wave's intrinsic frequency omega sub 0 can be less than the effective Coriolis frequency of the surrounding ocean. Waves that are not trapped are focussed into tight beams as they leave the jet. Observations confirm these predictions. Intense downward-propagating near-inertial waves have been observed as the base of upper ocean negative vorticity in the North Pacific Subtropical Front, warm-core rings, a Gulf Stream cold-core ring and an anticyclonic eddy in the Sargasso Sea. Dissert. Abstr.

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N86-25109# Management and Technical Services Co., Washington, D.C.
USSR SPACE LIFE SCIENCES DIGEST, ISSUE 5 Final Report
Lydia Razran Hooke, ed., Mike Radtke, ed., Victoria Garshnek, ed., Ronald Teeter, ed., and Joseph E. Rowe, ed. (Library of Congress, Washington, D.C.) Washington NASA Apr. 1986 119 p
(Contract NASw-3676)
(NASA-CR-3922(05); NAS 1.26:3922(05)) Avail: NTIS HC A06/MF A01 CSCL 06C

This is the fifth issue of NASA's USSR Space Life Sciences Digest. It contains abstracts of 37 papers recently published in Russian language periodicals and bound collections and of 11 new Soviet monographs. Selected abstracts are illustrated with figures and tables from the original. Additional features include a translated interview, a book review and a conference description and abstracts or titles of relevant Soviet papers presented in English at international conferences. The materials covered in this issue have been identified as relevant to 26 areas of aerospace medicine and space biology. These areas are biological rhythms, biospherics, body fluids, botany, cardiovascular and respiratory systems, endocrinology, exobiology, genetics, group dynamics, habitability and environment effects, health and medical treatment, hematology, human performance, immunology, mathematical modeling, metabolism, microbiology, morphology and cytology, musculoskeletal system, neurophysiological, nutrition, perception, personnel selection, psychology, and radiobiology. Author

N86-25110# Army Research Inst. of Environmental Medicine, Natick, Mass.
RESEARCH ANIMAL STANCHION AND TRANSPORTER
Vincent A. Forte, Jr. and William A. Sawyer Jan. 1986 16 p refs
(AD-A163907; USARIEM-M-12/86) Avail: NTIS HC A02/MF A01 CSCL 06/3

A stanchion has been designed to restrain mid-size laboratory animals such as goats, dogs, and pigs while performing respiratory and surgical procedures. The restraint device permits control of the animal during induction and recovery from general anesthesia, provides transportation between locations, and constrains the animial during surgery without the need of a shackle device. GRA

52 AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

N86-25111 National Aeronautics and Space Administration, Washington, D.C.
AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 284)
May 1986 59 p
(NASA-SP-7011(284); NAS 1.21:7011(284)) Avail: NTIS HC A04 CSCL 06E

This bibliography lists 148 reports, articles, and other documents introduced into the NASA scientific and technical information system in April 1986. Author

N86-25112# Norwegian Defence Research Establishment, Kjeller. Forsvarets Forskningsinstitutt.
CHEMICALLY INDUCED DAMAGE TO THE HIPPOCAMPAL FORMATION
Liv Unni Naalsund May 1986 91 p refs Sponsored in cooperation with the Royal Norwegian Council for Scientific and Industrial Research
(NDRE/PUBL-86/1002; ISSN-0800-4412) Avail: NTIS HC A05/MF A01

Degeneration of the hippocampal formation after trimethyltin (TMT) administration can be detected at an early phase by electric recordings from intrahippocampal electrodes. The anatomical distribution of the damage can be studied by histochemistry, and was shown to include the CA3 and CA4 subfields in the initial period and spreading to the CA1 after a complete destruction of the pyramidal cells in CA3 and CA4. The degeneration was shown to be specific for glutamergic neurons in the hippocampus, high affinity uptake of [3H] glutamate being the only biochemical parameter which was changed. In vitro TMT increased the efflux of [3H] glutamate from synaptosomes in the resting state, but had no effect on the efflux of [3H] GABA. The synaptosomal reuptake of transmitter and receptor binding were both inhibited in the presence of TMT. In relation to reports on TMT as an anion conductor, the effect of changes in extracellular Cl(-) concentration on transmitter release was investigated. A reduction in the external Cl(-) concentration was shown to have a much larger effect on the efflux of transmitter from glutamergic than from GABAergic synaptosomes. The sensitivity of the hippocampal electric activity to changes after exposure to toxic compounds was utilized for the investigation of a put active neurotoxic effect of long term exposure to low levels of toluene. An increased synchronization together with an increased frequency in the theta waves was observed during the first period of toluene exposure. The later phase was characterized by a gradually increasing disruption in regular waves and a reduction in the theta frequency. No improvements regarding regularity or frequency was seen during one month after termination of exposure, indicating that irreversible changes in neuronal functions have occurred. Author

N86-25113# Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).
A REVIEW OF THE PILOT BACKACHE PROBLEM IN THE CH113 LABRADOR HELICOPTER
A. Beach Dec. 1985 26 p refs
(AD-A164011; DCIEM-85-R-49) Avail: NTIS HC A03/MF A01 CSCL 06/19

In response to an Unsatisfactory Condition Report, complaints of back pain and discomfort induced by the pilots' seat of the CH113 Labrador helicopter were investigated. Several published reports dealing with the problem are reviewed and summarized in terms of incidence and prevalence rates, frequency, intensity, duration, location and time to pain onset. A questionnaire was developed and distributed to CH113 Labrador helicopter pilots in order to determine how closely the backache characteristics of the pilots match the characteristics reported by the general population. In addition, an evaluation of the size and shape of the Labrador seat was conducted and results were compared to published seat design guidelines and recommendations. Questionnaire results indicate that the typical backache reported by Labrador pilots is similar to the backache reported by other helicopter pilots. It is usually a dull pain in the lumbar area, most often experienced during flight and usually lasting after the mission ends. Subjective results also indicate that backache may be negatively correlated with regular exercise. Based on the symptoms identified in the questionnaire and the causes identified by other investigators, design principles for an improved seat incorporating an inflatable lumbar support and a more effective load bearing seat cushion were established. GRA

N86-25114# Toronto Univ., Downsview (Ontario). Defence and Civil Inst. of Environmental Medicine.
REVIEW OF MODIFIED HEMOGLOBIN SOLUTIONS FOR USE AS TEMPORARY BLOOD SUBSTITUTES
Lucjan J. J. Hronowski Dec. 1985 31 p refs
(AD-A164210; DCIEM-85-R-51) Avail: NTIS HC A03/MF A01 CSCL 06/15

The present review will focus on blood substitutes using hemoglobin solutions as oxygen carriers. It will review the more recent developments and discuss the limitations and problems associated with the present hemoglobin preparations. This will be covered under the headings of purification of hemoglobin, modification and polymerization of the hemoglobin molecule and the biological activities of the hemoglobin solutions. Polymerization of hemoglobin is currently the only means of obtaining a physiological concentration of hemoglobin which is iso-oncotic with plasma. Polymerized pyridoxylated hemoglobin is currently the most widely used example of such an iso-oncotic hemoglobin solution having normal oxygen carrying capacity. Such solutions, however, are heterogeneous polydispersed mixtures of widely different molecular weight. In addition, these solutions still contain about 20% of the unpolymerized tetramer which is rapidly eliminated in the urine. These solutions also have oxygen affinities which are considerably higher than those found in the red blood cells. In addition to their effectiveness, the hemoglobin solutions must be shown to be safe. Safety studies on the polymerized and modified homoglobin solutions must address issues such as hematological responses, vasoactive ef fects, effect on the reticuloendothelial system, effect on immunocompetence, antigenicity, nephrotoxicity, and iron toxicity. GRA

N86-25115# California Univ., Irvine.
MULTIDISCIPLINARY STUDIES ON EXCITATORY AMINO ACIDS AS TRANSMITTERS IN THE BRAIN Final Report, 27 Sep. 1982 - 26 Sep. 1985
Carl W. Cotman 7 Nov. 1985 9 p refs
(Contract DAAG29-82-K-0194)
(AD-A164258; ARO-19016.14-LS) Avail: NTIS HC A02/MF A01 CSCL 06/1

The major goal has been to analyze the excitatory amino acid receptors in the brain, particularly those mediating responses by glutamate and aspartate. Acidic amino acids, principally L-glutamate and L-aspartate, appear to be the major excitatory transmitters in the CNS. As such, these molecules may be the most abundant CNS neurotransmitter class. L-Glutamate shows many of the characteristics of other neurotransmitters. Glutamate is present in high levels in the brain and is relatively enriched in select neurons. Transmitter glutamate is supplied to nerve terminals by synthesis, primarily via the enzyme glutaminase, and by high affinity uptake. The mechanism for transmitter inactivation in the synapse appears to be the rapid removal by a high affinity uptake system. Both endogenous L-glutamate and L-glutamate derived from exogenously supplied radiolabelled precursors exhibit Ca(++)- dependent release upon depolarization. A transport system responsible for the loading of L-glutamate into synaptic vesicles has also been identified. Excitatory amino acids act on a variety of distinct receptor types, and there are now available many compounds which can mimic or block synaptic activity at excitatory amino acid using synapses. Our approach has involved the analysis of these receptors in isolated synaptic membranes and their further definition

and anatomical localization via light microscopic autoradiography. GRA

N86-25116# Indiana Univ., Bloomington. Dept. of Chemistry.
ISOTOPIC STUDY OF THE INHALATION TOXICOLOGY OF OXIDANTS
J. M. Hayes and J. Santrock Jun. 1985 200 p Sponsored in part by Health Effects Research Lab.
(PB86-109485; EPA-600/1-85-013) Avail: NTIS HC A09/MF A01 CSCL 06T

The purpose was to develop novel methods to investigate the biological fate of inhaled ozone and other oxygen-containing pollutants in animal and human tissues using the heavy isotope of oxygen, oxygen-18 (18O). Methods were developed which facilitated the conversion of tissue oxygen to CO2 and the subsequent trapping of the CO2 so that it could be subjected to isotope-ratio mass spectrometry. The ratios of the various masses of evolved CO2 were used to calculate the 18O content of the original tissues, thus enabling the detection of isotopic enrichments as small as 0.4%. The above procedures were performed by modification of a commercially available elemental analyzer to include effluent columns and trapping devices, development of oxygen isotopic standards, and derivation of mathematical models for correction of blank and memory effects originating during sample pyrolysis. These techniques were applied with success to the determination of the biological fate of inhaled ozone, and to the measurement of tissue oxidation induced by a model peroxidation initiator, carbon tetrachloride. Author

N86-25117# Federal Communications Commission, Washington, D. C. Office of Science and Technology.
EVALUATING COMPLIANCE WITH FCC (FEDERAL COMMUNICATIONS COMMISSION) SPECIFIED GUIDELINES FOR HUMAN EXPOSURE TO RADIOFREQUENCY RADIATION
R. F. Cleveland Oct. 1985 58 p
(PB86-127081; OST/BULL-65) Avail: NTIS HC A04/MF A01 CSCL 06R

The technical bulletin provides information and guidelines for use in evaluating compliance with FCC-specified environmental rules dealing with human exposure to radiofrequency (RF) radiation. It provides assistance in determining whether an FCC-regulated facility might create a significant environmental effect due to human exposure to levels of RF radiation in excess of specified radiation protection guides. Emphasis is placed on exposure from broadcast facilities. However, the bulletin also contains information relevant to certain other RF-emitting sources. GRA

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N86-25118# Air Force Academy, Colo.
BEHAVIORAL CONSIDERATIONS FOR SPACE STATION DESIGN Final Report, Oct. 1984 - Dec. 1985
Frank R. Wood and Karen O. Dunivin Jan. 1986 69 p refs
(AD-A163478; USAFA-TR-86-3) Avail: NTIS HC A04/MF A01 CSCL 05/10

Flight crews are more than just the sum of the members' individual technical skills. They are dynamic and constantly changing systems of interacting units. The critical factor in this system is the interaction process. Factors which affect this interaction process are design considerations critical to the successful operation of the human system in space. Future space missions will be longer and will involve more routine tasks. Crews will be larger and more heterogeneous. These conditions make proper consideration of group dynamics principles imperative. Formal design of future space missions should consider critical design factors which promote the group process. The real change to current NASA mission design suggested by this report is that greater consideration be given to the informal processes characteristic of the human system. Consideration of these factors will pay large dividends in terms of human system performance and neglect of these factors will incur costs. GRA

N86-25119# Colorado Univ., Boulder. Center for Research on Judgment and Policy.
GENERALIZING OVER CONDITIONS BY COMBINING THE MULTITRAIT MULTIMETHOD MATRIX AND THE REPRESENTATIVE DESIGN OF EXPERIMENTS
Kenneth R. Hammond, Robert M. Hamm, and Janet Grassia Jan. 1986 64 p refs
(Contracts N00014-81-C-0591; BRSG-RR-07013-14)
(AD-A163685; CRJP-255A) Avail: NTIS HC A04/MF A01 CSCL 05/10

Analytical methods should be substituted for the current largely intuitive methods for generalizing results over conditions. Toward that end we present a methodology that combines Campbell and Fiske's (1959) multitrait multimethod matrix and Brunswik's (1956) representative design of experiments. A description of a study of expert judgement and a critique of current practices illustrate the methodology. GRA

N86-25120# Stanford Univ., Calif.
STATISTICAL INFERENCES IN CROSS-LAGGED PANEL STUDIES
Lawrence S. Mayer Nov. 1985 51 p refs
(Contract DAAG29-82-K-0156)
(AD-A163892; TR-15; ARO-19065.16-MA) Avail: NTIS HC A04/MF A01 CSCL 12/1

Cross-lagged panel studies are statistical studies in which two or more variables are measured for a large number of subjects at each of several waves or points in time. The variables divide naturally into two sets and the primary purpose of the analysis is to estimate and test the cross-effects between the two sets. Such studies are found in the mainstreams of social behavioral and business research. One approach to this analysis is to express the cross-effects as parameters in regression equations and then use regression methods to estimate and test the parameters. We contribute to this approach by extending the regression model to a multivariate model that captures the correlation between the dependent variables. We develop estimators for the parameters of this model and hypothesis tests for assessing the presence of effects and cross-effects. We demonstrate our results with the analysis of a cross-lagged panel study of the perceptions and attitudes of patients toward a health maintenance organization. Author (GRA)

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N86-25121*# Essex Corp., Huntsville, Ala. Space Systems Group.
THE DESIGN, FABRICATION AND DELIVERY OF A MANIPULATOR FOOT RESTRAINT MOCKUP FOR SPACE TELESCOPE DEVELOPMENT TESTING Final Report
Michael A. Hollingsworth 11 Apr. 1986 12 p refs
(Contract NAS8-36366)
(NASA-CR-178837; NAS 1.26:178837; H-86-05) Avail: NTIS HC A02/MF A01 CSCL 05H

The Manipulator Foot Restraint (MFR) is a subsystem of the Remote Manipulator System (RMS) which plays a major role in servicing the Hubble Space Telescope (HST) in orbit. Flight drawings were used to construct the MFR to guarantee that the mockup components were functionally equivalent to the flight MFR. Material surface finishes and tolerances that were compatible to the Neutral Buoyance Simulator (NBS) environment were used. Recommendation for improvements are discussed. B.G.

N86-25122*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

PHYSICAL, ANTHROPOMETRICAL, AND BODY COMPOSITION CHARACTERISTICS OF WORKERS AT KENNEDY SPACE CENTER

Mary L. Lasley Sep. 1985 55 p refs

(Contract NAS10-10285)

(NASA-TM-83102; NAS 1.15:83102) Avail: NTIS HC A04/MF A01 CSCL 05H

At the Kennedy Space Center, workers are often exposed to cardiovascular and muscular stress in job-related activities which may require a high level of physical fitness in order to safely complete the work task. Similar tasks will be performed at other launch and landing facilities and in space for the Space Station. One such category includes workers who handle toxic propellants and must wear Self-Contained Atmospheric Protective Ensembles (SCAPE) that can weigh 56 lbs. with the air pack. These suits provide a significant physical challenge to many of the workers in terms of carrying this load while moving about and performing work. Furthermore, under some conditions, there is a significant thermal stress. The physical characteristics of these workers are, therefore, of consequence. The purpose of this study was to analyze the anthropometry, body composition, strength, power, endurance, flexibility, aerobic fitness, and blood variables of a representative sample of male KSC SCAPE workers and to compare them with characteristics of other male workers at KSC (total population N=110). Three separate comparisons were made. Author

N86-25123# Naval Postgraduate School, Monterey, Calif.

MAN-MACHINE SYSTEMS OF THE 1990 DECADE: COGNITIVE FACTORS AND HUMAN INTERFACE ISSUES

Paul J. Hoffman Aug. 1985 53 p refs

(AD-A163865; NPS74-85-002) Avail: NTIS HC A04/MF A01 CSCL 05/8

This paper presents the primary psychological concepts which are fundamental to the design of man-machine interfaces for intelligent systems of the 1990's. These concepts embrace perception, learning motivation, and cognitive capacities of human operators, in systems which require a high degree of operator-machine interaction. The central role of feedback is emphasized through simple schematic examples, designed to provide an understanding of the reciprocity requirements in man-machine communication. Cognitive theory and recent experimental data form the basis for discussion of visual image storage, short-term memory, long-term memory, transfer rates and buffering of information being processed by the human operator, under control of a central processor with a cycle time of roughly 70 milliseconds. Systems of the 1990 era will provide increased capability for high-speed processing of data and will utilize increasing numbers of decision-aides, spreadsheets and AI tools. Users of these systems will be components of networks, linked via efficient communication systems to other users and other subsystems. These developments will lead to fundamental changes in the work place. GRA

N86-25124# Naval Submarine Medical Research Lab., Groton, Conn.

THE EFFECT OF COLD TRAINING AND THE WEARING OF GLOVES ON MANUAL PERFORMANCE IN THE COLD: A COMPARISON OF PURE ABILITY AND OPERATIONAL TASKS Final Report

William H. Rogers 14 Nov. 1985 19 p refs

(AD-A163893; NSMRL-1067) Avail: NTIS HC A02/MF A01 CSCL 06/17

Cold-induced manual performance decrements pose a serious problem for military cold weather operations. Experiments were based on the notion that the amount of decrement, and possibly the best means for reducing that decrement, depend on the specific motor abilities required to perform a given task. Experiments have been performed using a battery of pure-ability tasks so that ultimately results could be generalized to any task. The study conducted here had the following goals: (1) to complement the previous studies in terms of the cold temperatures tested, and obtain profiles of performance of decrements and cold-injury dangers across a range of cold temperatures; (2) to assess the wearing of gloves and temperature-specific training as potential methods of reducing or eliminating cold-induced manual performance decrements; and (3) to validate and compare results previously and currently obtained using pure-ability tasks with those obtained using operational tasks. A battery of five pure ability and four operational tasks were administered to six four-man groups of U.S. Marines. Three groups practiced the tasks at room temperature on the first of three training days and at -10 C on the other two training days, while the other three groups practiced at room temperature on all three days. GRA

N86-25125# Naval Submarine Medical Research Lab., Groton, Conn.

AN EVALUATION OF COLOR SETS FOR CRT DISPLAYS Interim Report

D. F. Neri, A. R. Jacobson, and S. M. Luria 31 Dec. 1985 30 p refs

(AD-A163894; NSMRL-1068) Avail: NTIS HC A03/MF A01 CSCL 06/16

Ten subjects performed a color matching task with ten sets of seven colors, adapted from sets recommended in the literature. The color sets covered a wide range in color difference values. Performance with some color sets was significantly better than that with others on a task where color discrimination was important and the colors needed to be discriminated quickly and accurately. Effectiveness of a color set did not depend on the inclusion of any particular colors; rather, the relationships among colors proved to be important. The larger the color difference value between the two most perceptually similar members of a set, the shorter the reaction time and the fewer the errors on the color matching task. Author (GRA)

N86-25126# National Inst. for Occupational Safety and Health, Cincinnati, Ohio. Div. of Biomedical and Behavioral Science.

COMPENDIUM OF PROTECTIVE EYEWEAR

C. E. Moss Mar. 1985 87 p refs

(PB86-135779) Avail: NTIS HC A05/MF A01 CSCL 06Q

Wearing apropriate eye and face protection devices will prevent or minimize most eye and/or facial injuries. However, at present there is no data source available on commercially available eye and face protectors. To provide characteristics and other product information, this compendium has been developed to list all commercially available eyewear products manufactured in the United States as of July 1, 1984. The protectors listed in this compendium include spectacles, goggles, welding helmets/hand shields, face shields, and filter plates. The information provided will assist the health and safety community in selecting appropriate eye and face protection for the job. GRA

55 PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

No abstracts in this category.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N86-25127# Rome Air Development Center, Griffiss AFB, N.Y.
OPTICAL DISK TECHNOLOGY FOR LARGE SCALE MASS STORAGE Report, Jan. - Apr. 1985
Jack D. Petruzelli Dec. 1985 33 p refs
(AD-A163453; AD-E401440; RADC-TM-85-17) Avail: NTIS HC A03/MF A01 CSCL 09/2

Optical disks have been under intense investigation as a digital mass storage mechanism since the mid 1970's. Since that time, even before potential manufacturers had systems in hand, the technology has been touted as the panacea to cure all the supposed ills of magnetic based storage mechanisms. It is very important to gain an understanding of the digital optical disk and what it can or cannot do in a particular application scenario before deciding if it is the answer to a storage problem. The potential techniques employed to overcome some of the perceived shortcomings are discussed. GRA

N86-25128# Naval Ship Research and Development Center, Bethesda, Md. Computation Mathematics and Logistics Dept.
PERMANENT FILE BACKUP FOR THE CDC MASS STORE SYSTEM Final Report
Mary T. Novak Nov. 1985 24 p refs
(AD-A163524; DTNSRDC/CMLD-85/13) Avail: NTIS HC A02/MF A01 CSCL 09/2

The Mass Store system is used to store a large number of user files. Users store files on Mass Store from the NOS/BE machines. The idea behind storage on Mass Store is that a large amount of information can be saved on Mass Store with no worries of reaching full disk capacity. Files that have not been accessed recently are written to cartridge and the disk space is released. Also, there is no limit to how long a file can exist; a file will not be purged due to lack of use. A presentation is given of a locally designed procedure that ensures that each file stored on Mass Store is also backed up by Mass Store. This procedure replaces the previous method which used standard nine-track tapes as the backup media. GRA

N86-25129# Naval Postgraduate School, Monterey, Calif.
A SINGLE BOARD MULTIPROCESSOR FOR REAL-TIME CONTOUR SURFACE DISPLAY GENERATION
Michael J. Zyda and Robert A. Walker Jan. 1986 22 p refs
(AD-A163587; NPS52-86-003) Avail: NTIS HC A02/MF A01 CSCL 09/2

This document presents an integrated systems design for a VLSI multiprocessor capable of generating contour surface displays in real-time (one-thirtieth of a second). It begins by examining an application that requires real-time contour surface display generation. The authors sketch some outlines for an architecture based upon a decomposable algorithm recently published. They then propose an architecture for a single board VLSI contour surface display generator that is pluggable into the Multibus of the Silicon Graphics, Inc. IRIS workstation. GRA

N86-25130# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
UNIFIED MATRICES FOR ELECTRONIC COMPUTERS
27 Jan. 1986 5 p refs
(AD-A163689; FTD-ID(RS)T-0036-86) Avail: NTIS HC A02/MF A01 CSCL 09/2

This standard extends to the ferrite-core matrices operating on the ZD principle, which are intended for the storage units of the general-purpose electronic computers using the number system with a base of 2. GRA

N86-25131# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
DEVELOPMENT OF A RUN TIME MATH LIBRARY FOR THE 1750A AIRBORNE MICROCOMPUTER M.S. Thesis
Steven A. Hotchkiss Dec. 1985 204 p refs
(AD-A163905; AFIT/GCS/MA/85D-5) Avail: NTIS HC A10/MF A01 CSCL 09/2

A run-time math library for the MIL-STD-1750A embedded computer architectures is discussed. The math library consists of the circular trigonometric functions and their inverses. In addition, the steps required for the performance analysis of the math library have been outlined. Several approximation methods were investigated, but the Chebysher Economization of the Maclaurin series polynomials, and rational approximations derived from the second algorithm of Remes were determined to be the best available. Each function's implementation was designed to take advantage of features of MIL-STD-1750A architectures. The recommended test procedures will provide measures of the average and worst case generated errors within each approximation. The computer program is provided. GRA

N86-25132# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
ARCHITECTURE AND NUMERICAL ACCURACY OF HIGH-SPEED DFT (DISCRETE FOURIER TRANSFORM) PROCESSING SYSTEMS M.S. Thesis
Kent Taylor Dec. 1985 222 p refs
(AD-A163963; AFIT/GE/ENG/85D-47) Avail: NTIS HC A10/MF A01 CSCL 09/1

This thesis examines a very large-scale integrated (VLSI) circuit implementation of the Winograd and Good-Thomas Algorithms for computing discrete Fourier transforms (DFTs) with composite blocklengths after developing the theoretical background for calculating DFTs, the algorithms of interest are presented. A VLSI architecture, which exploits the parallelism and pipelining inherent in the algorithms, is then discussed. Winograd processors use both the small and large Winograd algorithms to compute DFTs with blocklengths of 15, 16, and 17. Longer blocklength DFTs (240, 255, 272, and 4080) are computed using a pipeline of Winograd processors, dual-port memories, and an interface processor; the pipeline uses the Good-Thomas prime factor algorithm. Fault tolerant is computed in the initial design of the VLSI architecture. Watchdog processors check both data and addresses of active Winograd processors, while parity checking circuits incorporated in the Winograd processors augment memory error-correction coding. A software simulation determined the numerical accuracy of the VLSI circuit. The signal-to-noise ratio was used as the accuracy metric. The signal was the output of a standard module, which used double-precision arithmetic, while the noise was the difference between the standard and the simulation module. The simulation module used integer arithmetic to exactly mimic operation of the VLSI circuit. Outputs of the standard module were compared with a direct evaluation of the DFT. GRA

N86-25133# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
CONTENT-ADDRESSABLE MEMORY MANAGER: DESIGN AND EVALUATION M.S. Thesis
Mark C. Rowe Dec. 1985 355 p refs
(AD-A164037; AFIT/GE/ENG/85D-36) Avail: NTIS HC A16/MF A01 CSCL 09/2

This research covers basic issues in implementing a Content-Addressable Memory (CAM) for a microcomputer. The thesis compares the various types of CAM organizations and presents a set of standards to distinguish true CAM from CAM-like memory. Issues such as the meaning of content to the host computer are discussed. This discussion leads to the implementation issues of how the CAM should operate with the host computer. The two configurations addressed in detail: a completely integrated approach and a peripheral approach. The thesis does not address the associative processor configurations found in PEPE, STARAN, or MPP. The case is presented that the peripheral device approach is the most practical approach. The peripheral device,

CAM board, using the AFIT CAM IC chips, will be controlled from a dedicated device that is designed and evaluated in this thesis. The architecture and operation of the CAM IC chip controller (CAM Manager) is derived from the desire to have a general purpose device that will have a small instruction set. The instructions will allow for efficient operations on applications as diverse as LISP garbage collection, database searching, and array arithmetic. This thesis compares a conventional computer executing the test applications and the same computer using the CAM board. The test applications were: (1) addition over all elements of an array, (2) LISP garbage collection, and (3) image recognition. The CAM board can enhance the performance of the host microcomputer. GRA

N86-25134# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DEVELOPMENT AND IMPLEMENTATION OF THE X.25 PROTOCOL FOR THE UNIVERSAL NETWORK INTERFACE DEVICE (UNID) 2. VOLUME 2 M.S. Thesis
Mark W. Weber Dec. 1985 241 p refs
(AD-A164042; AFIT/GE/ENG/85D-52-Vol-2) Avail: NTIS HC A11/MF A01 CSCL 17/2

This thesis describes the continued development of an improved Universal Network Interface Device (UNID II). The UNID II's architecture was based on a preliminary design project at the Air Force Institute of Technology. The UNID II contains two main hardware modules; a local module for the network layer software and a network module for the data link layer software and physical layer interface. Each module is an independent single board computer (SBC) residing on an Intel multibus chassis, complete with its own memory (EPROM and RAM), serial link interfaces, and multibus interface. The local module is an iSBC 544 and the network module is an iSBC 88/45. The network layer software supports the CCITT X.25, datagram option, protocol and the data link layer software supports the CCITT X.25 LAPB (HDLC) protocol. This report documents the further implementation of the CCITT X.25 protocol in the UNID II design. GRA

N86-25135# Naval Postgraduate School, Monterey, Calif.
INTRODUCTION TO THE MICROCOMPUTERS FOR SOLVING RADAR AND ELECTRONIC WARFARE PROBLEMS M.S. Thesis
Constantinos D. Vergos Dec. 1985 252 p refs
(AD-A164143) Avail: NTIS HC A12/MF A01 CSCL 17/9

This thesis has been written to solve different types of problems through microcomputers in the radar and electronic warfare field. These problems are offered as subjects at the Naval Postgraduate School in Courses EC 4432/33, EC 4484, and EC 3431. The computer programs that solve these computer problems have been written in an interactive method because it is user friendly and also so that anyone can change any given parameter or characteristics of radars and jammers and thus study their performance for the purpose of using or designing them. In solving these problems, the following have been taken into account: the performance of the radars, the ability of the radars to track targets, the design of radars for special purposes, and the design and study of different types of jammers. Special emphasis has been given to select these problems so that there would be a diverse field of different types of radars and jammers for numerous purposes, including their use in different conditions of operations. This selection of problems has been done in such a way that they can help a training officer to comprehend and perceive or to help an engineer evaluate a radar or a jammer he/she may wish to design. GRA

N86-25136# Naval Postgraduate School, Monterey, Calif.
MICROPROCESSOR CONTROLLER WITH NONVOLATILE MEMORY IMPLEMENTATION M.S. Thesis
Jay W. Wallin Dec. 1985 130 p refs
(AD-A164152) Avail: NTIS HC A07/MF A01 CSCL 09/2

In support of the Naval Postgraduate School's space program, a small, self-sufficient, low power microprocessor controller with nonvolatile memory has been designed, constructed and tested. Because of limited battery power availability, Complementary Metal-Oxide Semiconductor components have been used. The controller uses the National semiconductor NSC800 CPU along with three NSC810A RAM-I/O-Timers. Other features include a 16 channel analog-to-digital converter, a real time clock, local memory in the form of EPROM and RAM, and the Intel BPK 72 Bubble Memory System. The general nature of the controller allows it to be reprogrammed and utilized in a variety of applications. Prior research using the NSC888 Self-Contained NSC800 Evaluation System Ref. 1 has been expanded upon in this thesis project. Author (GRA)

N86-25137# Naval Postgraduate School, Monterey, Calif.
ANALYSIS AND DESIGN OF A PARAMETERIZED PROTOCOL CONVERTER M.S. Thesis
Berle Garris, Jr. Dec. 1985 109 p refs
(AD-A164171; AD-E750890) Avail: NTIS HC A06/MF A01 CSCL 09/2

Designed to circumvent the incompatibilities between communicating computer systems, a parameterized protocol convertor permits the use of communication equipment supporting variations of the same communication protocol or completely different framing technique protocols. The analysis of the conversion process includes the engineering trade-offs between speed of conversion and flexibility, and the use of an alternative flow architecture. Flexibility is enhanced through user selection of input and output protocol types, and the designation of functional specifics, such as code type, header length, and error detection methods, with variable parameters. The speed of conversion is increased through the parallel processing of the framing, transparency, and error control subfunctions and the use of a single byte storage technique. The single byte storage technique imposes some limitations in the use of transparent data. Author (GRA)

N86-25138# Naval Postgraduate School, Monterey, Calif.
IMAGE SEGMENTATION USING THE MILITARY SPECIFICATION 1750A M.S. Thesis
Percy D. Cody, III Dec. 1985 81 p refs
(AD-A164180) Avail: NTIS HC A05/MF A01 CSCL 09/2

The use of digital computers to process various types of sensor data is becoming increasingly common, in both civilian and military applications. One example of this use is the enhancement of photographs to increase their clarity, or emphasize a particular detail. Previously, the computers used to perform this processing did it in specialized circuits, mainframe or minicomputers. More recently, extremely powerful microprocessors have become available that show potential to be applied in this area. This thesis explores a particular class of image processing, known as Image Segmentation, implemented on a particular microprocessor. The microprocessor is the Fairchild F9450, the first civilian version of the 1750A military specification microprocessor. This microprocessor, along with its associated chip set, appears well suited to image processing, having high speed capability, direct floating point arithmethic instructions, multiprocessing capacity, and the ability to address up to sixteen megabytes of memory. Additionally, a sophisticated software development tool set, known as Microprocessor Pascal, is available to develop and test software for the 1750A/F9450 microprocessor. This tool set allows software to be developed on the VAX-11/780 minicomputer, targeted for final use on the 1750A/F9450. GRA

N86-25139# National Weather Service, Garden City, N.Y.
ROTODRAW
T. Niziol Nov. 1985 21 p
(PB86-131828; NOAA-NWS-ERCP-35) Avail: NTIS HC A02/MF A01 CSCL 09B

The ROTORDRAW program draws a graphic product from a set of data points that are easily entered into an AFOS product from ADM. The user has the ability to zoom, offset, and rotate the object on the GDM screen. The zoom feature of the program is much more precise than the standard AFOS zoom. Up to 700 sets of x-y data points can be plotted. The program uses the AFOS Graphics Library, AG.LB, extensively. Drawing graphics is relatively straightforward, via the AFOS data product. GRA

N86-25140# National Bureau of Standards, Gaithersburg, Md. Center for Programming Science and Technology.
TECHNOLOGY ASSESSMENT: METHODS FOR MEASURING THE LEVEL OF COMPUTER SECURITY Final Report, 1980 - 1981
W. Neugent, J. Gilligan, L. Hoffman, and Z. G. Ruthberg 1985 208 p Prepared in cooperation with System Development Corp., McLean, Va. and George Washington Univ., Washington, D.C.
(PB86-129954; NBA/SP-500/133; LC-85-600600) Avail: NTIS HC A10/MF A01; also available SOD HC $8.00 as SN003-003-02686-7 CSCL 09B

The document is a companion to FIPS PUB 102, Guideline for Computer Security Certification and Accreditation. Since a security certification depends upon a technical security evaluation, this document is meant to provide information on twenty-five evaluation methods in common use today in the security, EDP audit, and risks analysis communities. GRA

N86-25141 Colorado Univ., Boulder.
THE USE OF CONTROLLED REDUNDANCY IN SELF-ADAPTIVE DATABASES Ph.D. Thesis
Nabil Nessim Kamel 1985 118 p
Avail: Univ. Microfilms Order No. DA8528496

A new approach for multiple query optimization in a centralized database is investigated. Given an arbitrary sequence of queries, it is shown that significant performance improvements can be obtained by considering the special statistical patterns inherent in the query stream and in the distribution of data. In order to realize these potential improvements, the optimal management of redundant temporaries, called the Derived Data Base is addressed. The problem is approached in a self-adaptive fashion by periodically reorganizing the contents of the temporaries to suit the common usage patterns. This approach differs from batched query processing in that the queries are not known in advance. The approach taken to handle updates is to keep the main database always up to date and to optimally select the contents of the temporaries based on their update history. In addition, a system of differential files is kept to retain the changes made in the temporaries.
Dissert. Abstr.

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N86-25142*# Virginia Univ., Charlottesville. Dept. of Computer Science.
THE IMPLEMENTATION AND USE OF ADA ON DISTRIBUTED SYSTEMS WITH HIGH RELIABILITY REQUIREMENTS Annual Report
J. C. Knight Mar. 1986 92 p refs
(Grant NAG1-260)
(NASA-CR-176760; NAS 1.26:176760; UVA/528213/CS86/108) Avail: NTIS HC A05/MF A01 CSCL 09B

The use and implementation of Ada in distributed environments in which reliability is the primary concern were investigted. A distributed system, programmed entirely in Ada, was studied to assess the use of individual tasks without concern for the processor used. Continued development and testing of the fault tolerant Ada testbed; development of suggested changes to Ada to cope with the failures of interest; design of approaches to fault tolerant software in real time systems, and the integration of these ideas into Ada; and the preparation of various papers and presentations were discussed. B.G.

N86-25143*# TRW Systems Group, Huntsville, Ala.
GROUND SOFTWARE MAINTENANCE FACILITY (GSMF) SYSTEM MANUAL Final Report
D. Derrig and G. Griffith 26 Feb. 1986 78 p
(Contract NAS8-32350)
(NASA-CR-178804; NAS 1.26:178804; TRW-41849-G159-024) Avail: NTIS HC A05/MF A01 CSCL 09B

The Ground Software Maintenance Facility (GSMF) is designed to support development and maintenance of spacelab ground support software. THE GSMF consists of a Perkin Elmer 3250 (Host computer) and a MITRA 125s (ATE computer), with appropriate interface devices and software to simulate the Electrical Ground Support Equipment (EGSE). This document is presented in three sections: (1) GSMF Overview; (2) Software Structure; and (3) Fault Isolation Capability. The overview contains information on hardware and software organization along with their corresponding block diagrams. The Software Structure section describes the modes of software structure including source files, link information, and database files. The Fault Isolation section describes the capabilities of the Ground Computer Interface Device, Perkin Elmer host, and MITRA ATE. B.W.

N86-25144*# TRW Defense and Space Systems Group, Huntsville, Ala.
GROUND SOFTWARE MAINTENANCE FACILITY (GSMF) USER'S MANUAL. APPENDICES NASA-CR-178806 NAS 1.26:178806 REPT-41849-G159-026-APP HC A05/MF A01 Final Report
V. Aquila, D. Derrig, and G. Griffith 28 Feb. 1986 86 p refs
(Contract NAS8-32350)
(NASA-CR-178806; NAS 1.26:178806;
Rept-41849-G159-026-App) Avail: NTIS HC A05/MF A01 CSCL 09B

Procedures are presented that allow the user to assemble tasks, link, compile, backup the system, generate/establish/print display pages, cancel tasks in memory, and to TET an assembly task without having to enter the commands every time. A list of acronyms is provided. Software identification, payload checkout unit operating system services, data base generation, and MITRA operating procedures are also discussed. B.G.

N86-25145*# Research Triangle Inst., Research Triangle Park, N.C. Software Research and Development.
AN EMPIRICAL STUDY OF FLIGHT CONTROL SOFTWARE RELIABILITY Final Report
Janet R. Dunham and John L. Pierce Mar. 1986 46 p refs
(Contract NAS1-16489)
(NASA-CR-178058; NAS 1.26:178058; Rept-412U-2094-22) Avail: NTIS HC A03/MF A01 CSCL 09B

The results of a laboratory experiment in flight control software reliability are reported. The experiment tests a small sample of implementations of a pitch axis control law for a PA28 aircraft with over 14 million pitch commands with varying levels of additive input and feedback noise. The testing which uses the method of n-version programming for error detection surfaced four software faults in one implementation of the control law. The small number of detected faults precluded the conduct of the error burst analyses. The pitch axis problem provides data for use in constructing a model in the prediction of the reliability of software in systems with feedback. The study is undertaken to find means to perform reliability evaluations of flight control software. E.A.K.

N86-25146# National Aeronautics and Space Administration, Washington, D.C.
DATA ANALYSIS ON THE ROTOR TEST STAND PROGRAM FOR INTERACTIVE PROCESSING
Wolfgang Breustedt Nov. 1985 32 p refs Transl. into ENGLISH of "Datenauswertung am Rotorversuchsstand Programm zur Interaktiven Auswertung" (Cologne, West Germany), DFVLR, 20 Sep. 1985 p 1-21 Transl. by SCITRAN, Santa Barbara, Calif.
(Contract NASw-4004)
(NASA-TM-77948; NAS 1.15:77948) Avail: NTIS HC A03/MF A01 CSCL 09B

A program is introduced, with which data from a rotor testing stand can be interactively processed. The Quick-Look-Data-Processing during the experiments at Deutsch Niederlandische Windkanal (DNW) (German-Dutch Windtunnel), where only one rotor revolution can be analyzed, yields usable results. The applied

mathematical principles and the data structure are explained.
Author

N86-25147# Rockwell International Corp., El Segundo, Calif. North American Aicraft Div.
CADS: A COMPUTER AIDED DESIGN SYSTEM, VOLUME 1 Final Report, Dec. 1981 - May 1985
Michael C. Less and Susan Manuel Dec. 1985 40 p 2 Vol.
(Contract F33615-81-C-3229)
(AD-A163556; AFWAL-TR-85-3066-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 09/2

This is the final summary report for the Computer Aided Design System, CADS. CADS is a pre and post processor for structural analysis and optimization programs based on the finite element method. The system supports five functional modules controlled by an Executive Monitor. All of these modules communicate with a data base through a data manager. In addition a post output translator, CADSPP, is available which processes output from finite element programs, e.g., NASTRAN, directly into the data base. This report gives an overview of the capability available in CADS. Several illustrations demonstrate the functions of the Preprocessor, Display, and Postprocessor Modules. GRA

N86-25148# RAND Corp., Santa Monica, Calif.
THE RAND-ABEL (TRADEMARK) PROGRAMMING LANGUAGE: REFERENCE MANUAL Interim Report
Norman Z. Shapiro, H. E. Hall, Robert H. Anderson, and Mark LaCasse Oct. 1985 122 p refs
(Contract MDA903-85-C-0030)
(AD-A163564; RAND/R-2367-NA) Avail: NTIS HC A06/MF A01 CSCL 09/2

This reference manual describes the RAND-ABEL programming language. In designing the RAND-ABEL language, we determined that RAND-ABEL should be suitable for large, rule-based systems; RAND-ABEL should be suitable for war gaming and multiscenario sensitivity analysis; RAND-ABEL should be suitable for use by any of several governmental gaming and analysis organizations. GRA

N86-25149# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
COMPARISON OF ABSORPTION AND RADIATION BOUNDARY CONDITIONS USING A TIME-DOMAIN THREE-DIMENSIONAL FINITE DIFFERENCE ELECTROMAGNETIC COMPUTER CODE M.S. Thesis
Clifford F. Williford Dec. 1985 186 p refs
(AD-A163828; AFIT/GE/ENG/85D-53) Avail: NTIS HC A09/MF A01 CSCL 20/3

The Three-Dimensional Finite Difference (3DFD) computer code is compared using Absorption Boundary Conditions (ABS) versus Radiation Boundary Conditions (RBC). This comparison is made when the 3DFD code is used to study the interaction of lightning with an aircraft. The 3DFD computer code is a modified version of Rymes' 3DFD. The aircraft modeled for the paper is and F-16 Fighting Falcon. The ABC used simulates an infinite free-space by setting the conductivity of the boundary space to that of distilled water, to absorb the outgoing electromagnetic waves. The RBC simulates free-space by assigning the boundary fields to a previously calculated value. The value is calculated with a parabolic interpolation of three previous field values, which are offset in space. Therefore, the calculated value is also extrapolated to account for the time delay and position change. The results of incorporating RBC were dramatic. The ten locations sampled for the test showed marked improvement in the waveforms when using RBC's. Depending on the purpose of the analysis, this improved waveform output may be overshadowed by the 25% increase in CPU time that is needed for the more sophisticated RBC. GRA

N86-25150# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
COMPUTER ASSISTED INSTRUCTION FOR THE C PROGRAMMING LANGUAGE ON THE ZENITH Z-100 MICROCOMPUTER SYSTEM AFIT/GCS/MA/85D-2 HC A11/MF A01 M.S. Thesis
Frank W. DeMarco Dec. 1985 227 p refs
(AD-A163842; AFIT/GCS/MA/85D-2) Avail: NTIS HC A11/MF A01 CSCL 09/2

The field known as computer assisted instruction, or CAI as support since the advent of the microcomputer. More and more people, including those in supervisory positions are beginning to see the advantages, both cost and time, in having training available in the workplace. This thesis developed a training package for use on the Zenith Z-100 microcomputer. The package consists of six lessons and three programs. The six lessons cover various topics dealing with the C programming language. The objective of these lessons is to present an introduction to the C programming language. The three programs are written in the Pascal programming language and are used to provide a means of displaying the lesson material, to provide a means of checking student progress, and to provide a means of displaying course statistics. GRA

N86-25151# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
USING ADA IN THE REAL-TIME AVIONICS ENVIRONMENT ISSUES AND CONCLUSIONS M.S. Thesis
Donald J. Witt Dec. 1985 121 p refs
(AD-A163844; AFIT/GCS/MA/85D-6) Avail: NTIS HC A06/MF A01 CSCL 09/2

This project involved studying the real-time avionics environment in which Ada will become the primary programming language in the near future. A set of issues of concern regarding the use of Ada within this environment was identified and described. Test programs, including the new Prototype Ada Compiler Evaluation Capability, were evaluated as to their applicability to these issues. The applicable test program were compiled and executed using two validated Ada compilers. Compile time and run time statistics were gathered to form a baseline against which other Ada compilers (preferably MIL-STD-1750a Ada compilers) may be compared.
GRA

N86-25152# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DEVELOPMENT OF A COMPUTER AIDED DESIGN PACKAGE FOR CONTROL SYSTEM DESIGN AND ANALYSIS FOR A PERSONAL COMPUTER (ICECAP-PC), VOLUME 1 M.S. Thesis
Susan K. Mashiko and Gary C. Tarczynski Dec. 1985 239 p refs
(AD-A163940; AFIT/GE/ENG/85D-46-Vol-1) Avail: NTIS HC A11/MF A01 CSCL 09/2

This thesis describes a computer-aided design (CAD) package for control system design and analysis. The package was implemented on different varieties of small personal computers. Structured design and other software engineering techniques were applied during the development effort. The program consists of a keyword-driven menu structure and a set of control system analysis procedures. The analysis procedures allow input of systems which are defined by transfer functions, polynomials, and matrices. Polynomials and matrices can be manipulated mathematically, and some block diagram manipulation can be performed on transfer functions as well. Author (GRA)

N86-25153# Harvard Univ., Cambridge, Mass. Dept. of Statistics.
ROBUST/RESISTANT TECHNIQUES OF DATA ANALYSIS Final Report, 1 May 1982 - 31 Aug. 1985
David C. Hoaglin and Frederick Mosteller 28 Oct. 1985 16 p refs
(Contract DAAG29-82-K-0085)
(AD-A163972; ARO-19236.10-MA) Avail: NTIS HC A02/MF A01 CSCL 09/2

Research under this contract focused on three basic problem areas: (1) critical data analysis (whose aim is to provide more formal inferences accompanying techniques of exploratory data analysis), (2) distribution shapes that end to arise in real data, and (3) computer implementation of some advanced techniques in exploratory data analysis. This final report summarizes the

research and the major results within each of these three areas. GRA

N86-25154# Colorado Univ., Boulder. Dept. of Computer Science.
A TRUST REGION ALGORITHM FOR NONLINEARLY CONSTRAINED OPTIMIZATION
Richard H. Byrd, Robert B. Schnabel, and Gerald A. Schultz Oct. 1985 36 p refs Sponsored in part by NSF
(Contract DAAG29-81-K-0108)
(AD-A163986; CU-CS-313-85; ARO-18197.7-MA) Avail: NTIS HC A03/MF A01 CSCL 12/1

Presented is a trust region-based method for the general nonlinearly equality constrained optimization problem. The method works by iteratively minimizing a quadratic model of the Lagrangian subject to a possibly relaxed linearization of the problem constraints and a trust region constraint. The model minimization may be done approximately with a dogleg type approach. It is shown that this method is globally convergent even if singular or indefinite Hessian approximations are made. A second order correction step that brings the iterates closer to the feasible set is described. If sufficiently precise Hessian information is used, this correction step allows us to prove that the method is also locally quadratically convergent and that the limit satisfies the second order necessary conditions for constrained optimization. An example is given to show that, without this correction, a situation similar to the Maratos effect may occur where the iteration is unable to move away from a saddle point. GRA

N86-25155# Kestrel Inst., Palo Alto, Calif.
KNOWLEDGE-BASED TRANSFORMATIONAL SYNTHESIS OF EFFICIENT STRUCTURES FOR CONCURRENT COMPUTATION Final Report, Oct. 1984 - Sep. 1985
Richard M. King 30 Sep. 1985 191 p refs
(Contract F49620-85-C-0015)
(AD-A164022; KES.U.85.5; AFOSR-85-1259TR) Avail: NTIS HC A09/MF A01 CSCL 09/2

The object of our research is the codification of programming knowledge for the synthesis of concurrent programs. This is important because concurrency is a way of securing better performance on amenable problems than is available on non-concurrent computers. We divide this knowledge into two sections: knowledge for the synthesis of arrays of processors that could be connected in a geometrically regular manner (crystalline concurrency), and knowledge for the synthesis of tree structure (tree concurrency). We use a transformational approach. The transformational system has rules each of which contains two predicates: an antecendent and a consequent. If the antecedent of a rule is true of a given object, the rule applies and the object is modified to make the consequent true. Author (GRA)

N86-25156# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DEVELOPMENT OF A COMPUTER AIDED DESIGN PACKAGE FOR CONTROL SYSTEM DESIGN AND ANALYSIS FOR A PERSONAL COMPUTER (ICECAP-PC). VOLUME 2 M.S. Thesis
Susan K. Mashiko and Gary C. Tarczynski Dec. 1985 395 p refs
(AD-A164044; AFIT/GE/ENG/85-D-46-Vol-2) Avail: NTIS HC A17/MF A01 CSCL 09/2

This appendix contains the data dictionary. The name, description, make-up, source, destination and the use of each of the variables, constants, type definitions and procedures are contained in this section. The entries are self-explanatory. Author (GRA)

N86-25157# Maryland Univ., College Park. Center for Automation Research.
PARALLEL PROCESSING OF REGION BOUNDARIES
Angela Y. Wu, S. K. Bhaskar, and Azriel Rosenfeld Nov. 1985 18 p refs
(Contract F49620-85-K-0009)
(AD-A164112; CAR-TR-159; CS-TR-1573; AFOSR-85-1216TR) Avail: NTIS HC A02/MF A01 CSCL 09/2

A region may be represented by specifying the curves that bound it. When p processors are available, typical operations on regions so represented can be performed much faster than using a single processor. This paper presents parallel algorithms to determine properties of regions, such as area; to perform operations on regions, such as union and intersection; to determine if a point lies inside a region; and to determine whether a given digital curve could be the boundary of a region. Some of the algorithms involve sorting, the time complexity of which depends on the particular model of parallel computation used. Author (GRA)

N86-25158# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
COMPUTER MODEL OF A PASSIVE SYNTHETIC APERTURE IMAGING SYSTEM M.S. Thesis
Christopher P. Kane Dec. 1985 123 p refs
(AD-A164144; AFIT/GEO/ENP/85D-2) Avail: NTIS HC A06/MF A01 CSCL 20/6

This thesis was concerned with the development of a computer model of a passive synthetic aperture imaging system. The research was divided into three parts. They were (1) applying an understanding of partial coherence theory and its relationship to the impulse response of the system, (2) developing the computer model, and (3) exercising the computer model to perform a sensitivity analysis. The system modeled consisted of two lenses mounted on a movable platform. The lenses were separated by a fixed distance and travelled in a direction parallel to this separation. The coherence of radiation present at each lens emanating from a real source was measured yielding the Fourier transform of the source intensity distribution according to the van Cittert-Zernike theorem (2:510). The transform was then multiplied by an effective aperture (obtained from the motion and position of the lenses relative to the source). An inverse Fourier transform was then applied to this result yielding the image. This is the process modeled by the computer. The results indicated that new means of image interpretation must be developed in order to make the results useful. This is due to the fact that the system behaves much like a high pass filter and the image is edge enhanced and not a scaled version of the geometric image. Author (GRA)

N86-25159# Naval Postgraduate School, Monterey, Calif.
ANALYSIS OF A DISTRIBUTED DECISION ALGORITHM M.S. Thesis
Sung C. Hahn Dec. 1985 78 p refs
(AD-A164181) Avail: NTIS HC A05/MF A01 CSCL 09/2

Distributed decision problems arise whenever two or more sensors and their associated computers must work cooperatively to make a decision about a commonly observed event. Typical examples are in target detection and classification. The problem is usually characterized by a limited bandwidth of the communication link between the sensors. This thesis develops and evaluates an algorithm for distributed decision and compares it to a non-distributed or centralized form of the algorithm. Analysis of the algorithm is carried out for some low-dimensional cases. Computer simulations were carried out for higher dimensional cases. The simulation work was done in FORTRAN under CMS on an IBM 370/3033 computer. GRA

N86-25160# Lawrence Livermore National Lab., Calif.
POSSOL: POISSON EQUATION SOLVER
William J. Orvis Aug. 1985 29 p
(Contract W-7504-eng-48)
(DE86-002292; UCID-20539) Avail: NTIS HC A03/MF A01

POSSOL is a two-dimensional Poisson solver for problems with arbitrary nonuniform gridding in cartesian coordinates. Actually, it will solve the Helmholtz equation on an arbitrary, non-uniform grid on a rectangular domain with unmixed boundary conditions. The routine is similar to PWSCRT developed by Schwarstrauber and Sweet at the National Center for Atmospheric Research. The routine is also amenable to the capacitance matrix technique which can be used to solve problems with mixed boundary conditions. Author

N86-25161# Los Alamos National Lab., N. Mex.
EXAMINATION OF THE CIRCLE SPLINE ROUTINE
R. M. Dolin and D. L. Jaeger Nov. 1985 44 p
(Contract W-7405-eng-36)
(DE86-004361; LA-10521-MS) Avail: NTIS HC A03/MF A01

The Circle Spline routine is a library file with several subroutines, which can generate splines in two and three dimensions. By using two programs, FUNCTION and CSPLINE, data points were generated, a data file, and a series of blended arcs linking data points produced. The insertion of the proper number of subpoints allows the blending of two arcs into one spline segment. Up to the critical number of subpoints, the accuracy and smoothness of the spline increased as more subpoints were used. Experiments revealed, however, that the blending process began to develop errors if too many subpoints were used and that persistent errors developed in cases of extreme variation of curvature (as in a cigar-shaped ellipse). The Circle Spline routine generally compares favorably with the Wilson-Fowler routine, the current DOE-NWC standard spline routine. DOE

N86-25162# National Bureau of Standards, Gaithersburg, Md.
BENCHMARK ANALYSIS OF DATABASE ARCHITECTURES: A CASE STUDY Final Report
S. B Yao, A. R. Hevner, and D. R. Benigni Oct. 1985 100 p
Prepared in cooperation with Software Systems Technology, Inc., College Park, Md.
(PB86-126687; NBS/SP-500/132; LC-85-600599) Avail: NTIS HC A05/MF A01; also available SOD HC $7.50 as SN003-003-02684-1 CSCL 09B

This guideline presents an application of the generalized performance analysis methodology for the benchmarking of database systems that was reported in NBS Special Publication 500-118. The principal objectives of this guide are to benchmark the performance of three distinct database system architectures: (1) a microcomputer database system; (2) a microcomputer database system; and (3) a database machine. This guide not only proves the viability of the benchmarking methodology in evaluating real systems, but it also provides comparable observations as to the capabilities of database systems based upon different architectures. Together with NBS Special Publication 500-118, this report serves as a reference for the benchmarking of database systems by providing a complete description of the benchmarking framework and a detailed application showing how to implement it. GRA

62 COMPUTER SYSTEMS

Includes computer networks.

N86-25163# M/A-COM Linkabit, Inc., Vienna, Va.
DSCS NETWORK PERFORMANCE SOFTWARE SUPPORT. REVISION Final Report, Dec. 1984-29 Nov. 1985
S. V. Trees, D. Hughes, S. Huffman, B. Maples, and J. Shattuck 7 Jan. 1986 134 p refs
(Contract DCA100-84-C-0009)
(AD-A163530; FR-170) Avail: NTIS HC A07/MF A01 CSCL 09/2

The purpose of this task was to evaluate the utilization of the DSCS Operational Control System (DOCS) and to provide version release test support for the DSCS Network Planning Software (DNPS). This report also examines the development of multiple beam antenna (MBA) algorithms to calculate beam weights that provide minimum mean square error (MSE) performance between desired and actual gain contour patterns. GRA

N86-25164# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DEVELOPMENT OF A DIGITAL INTERACTIVE CONTROLLER EVALUATION SYSTEM (DICES) M.S. Thesis
Scott B. Eckert Dec. 1985 440 p refs
(AD-A163966; AFIT/GE/ENG/85D-13) Avail: NTIS HC A19/MF A01 CSCL 09/5

The Digital Interactive Conotroller Evaluation System (DICES) is a user interactive system which permits the implementation of digital controller designs based on the TMS32010 digital-signal-processing microprocessor for a given single input-single output plant model. DICES partitions the controller design into second-order 3D filter sections and quantizes the coefficients. These coefficients are loaded into a generic filter program written in TMS32010 assembly language, which are then assembled and loaded into the TMS32010 for execution. The controller can be placed in the forward or feedback path of an analog computer system which reflects the plant model. Performance data is obtained via IEEE-488 controlled instruments under control of a VAX 11/780. GRA

N86-25165# Naval Postgraduate School, Monterey, Calif.
AN ADAPTIVE COLLISION RESOLUTION PROTOCOL FOR RANDOM ACCESSED CHANNELS M.S. Thesis
Turhan Gurer Dec. 1985 97 p refs
(AD-A164169; AD-E750890) Avail: NTIS HC A05/MF A01 CSCL 09/2

This thesis investigates the performance of two collision resolution protocols for a random accessed channel. The two proposed protocols are basically multislot collision resolution algorithms. In the first protocol, the number of slots opened is equal to the number of users involved in a collision. Each user randomly selects a slot. The second protocol is an adaptive version of the first protocol. Both of them are investigated numeric calculations and simulations. GRA

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N86-25166*# National Aeronautics and Space Administration. Dryden (Hugh L.) Flight Research Center, Edwards, Calif.
COMBINING AND CONNECTING LINEAR, MULTI-INPUT, MULTI-OUTPUT SUBSYSTEM MODELS
Eugene L. Duke Apr. 1986 33 p ref
(NASA-TM-85912; H-1264; NAS 1.15:85912) Avail: NTIS HC A03/MF A01 CSCL 09B

The mathematical background for combining and connecting linear, multi-input, multi-output subsystem models into an overall system model is provided. Several examples of subsystem configurations are examined in detail. A description of a MATRIX (sub x) command file to aid in the process of combining and connecting these subsystem models is contained. Author

N86-25167*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SHIFTING THE CLOSED-LOOP SPECTRUM IN THE OPTIMAL LINEAR QUADRATIC REGULATOR PROBLEM FOR HEREDITARY SYSTEMS Final Report
J. S. Gibson and I. G. Rosen Mar. 1985 48 p refs Submitted for publication Prepared in cooperation with California Univ., Los Angeles and University of Southern California, Los Angeles
(Contracts NAS1-17070; NAS1-18107; Grants AF-AFOSR-0309-84; AF-AFOSR-0393-84)
(NASA-CR-178082; ICASE-86-16; NAS 1.26:178082) Avail: NTIS HC A03/MF A01 CSCL 12A

In the optimal linear quadratic regulator problem for finite dimensional systems, the method known as an alpha-shift can be used to produce a closed-loop system whose spectrum lies to the left of some specified vertical line; that is, a closed-loop system with a prescribed degree of stability. This paper treats the extension of the alpha-shift to hereditary systems. As infinite dimensions, the shift can be accomplished by adding alpha times the identity to the open-loop semigroup generator and then solving an optimal regulator problem. However, this approach does not work with a new approximation scheme for hereditary control problems recently

developed by Kappel and Salamon. Since this scheme is among the best to date for the numerical solution of the linear regulator problem for hereditary systems, an alternative method for shifting the closed-loop spectrum is needed. An alpha-shift technique that can be used with the Kappel-Salamon approximation scheme is developed. Both the continuous-time and discrete-time problems are considered. A numerical example which demonstrates the feasibility of the method is included. Author

N86-25168*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THEORETICAL THREE-AND FOUR-AXIS GIMBAL ROBOT WRISTS
L. Keith Barker and Jacob A. Houck May 1986 38 p refs
(NASA-TP-2564; L-16042; NAS 1.60:2564) Avail: NTIS HC A03/MF A01 CSCL 09B

In high-performance flight simulations, a four-axis gimbal system allows all possible rotations with acceptable gimbal angle rates while it avoids the so-callled 'gimbal lock' that occurs when gimbal rotational axes are colinear. In this paper, pertinent equations (including quaternions) are assembled for a hypothetical robot wrist, functionally equivalent to this four-axis gimbal system, and also for a true three-axis gimbal robot wrist. These equations are used to simulate the rotation of a robot hand by the robot wrist in response to operator rotational velocity commands to the robot hand. Near gimbal lock (wrist singularity), excessive rotational rates occur. Scaling the rates, which is necessary for the three-gimbal robot wrist to prevent rate limiting, introduces an undesirable time delay in the robot hand rotation with respect to the commanded rotation. However, the merit of the four-gimbal robot wrist is that the fourth gimbal angle keeps the robot wrist away from the singularity so that the robot hand moves exactly as commanded. It appears that in a 'worst-type' maneuver of the robot hand, the fourth gimbal angle can be defined so that none of the gimbal angle rates exceed about twice the commanded rates. Author

N86-25169*# California Univ., Los Angeles.
AN APPLICATION OF ADAPTIVE LEARNING TO MALFUNCTION RECOVERY Final Report
Robert Edward Cruz May 1986 46 p refs
(Grant NAG2-302)
(NASA-CR-166620; H-1325; NAS 1.26:166620) Avail: NTIS HC A03/MF A01 CSCL 09B

A self-organizing controller is developed for a simplified two-dimensional aircraft model. The Controller learns how to pilot the aircraft through a navigational mission without exceeding pre-established position and velocity limits. The controller pilots the aircraft by activating one of eight directional actuators at all times. By continually monitoring the aircraft's position and velocity with respect to the mission, the controller progressively modifies its decision rules to improve the aircraft's performance. When the controller has learned how to pilot the aircraft, two actuators fail permanently. Despite this malfunction, the controller regains proficiency at its original task. The experimental results reported show the controller's capabilities for self-organizing control, learning, and malfunction recovery. Author

N86-25170# Yale Univ., New Haven, Conn. Dept. of Computer Science.
EDUCATION AND COMPUTERS: AN AI (ARTIFICIAL INTELLIGENCE) PERSPECTIVE
Roger C. Schank and Stephen Slade Oct. 1985 41 p
(Contracts N00014-85-K-0108; N00014-82-K-0149)
(AD-A163618; YALEU/CSD/RR-431) Avail: NTIS HC A03/MF A01 CSCL 05/10

Our work at the Yale Artificial Intelligence Project has provided key scientific insights into human cognitive behavior in general and learning in particular. These scientific developments can be applied to education. At the heart of thinking is the need to explain the unfamiliar. We regard intellectual curiosity as a major educational resource to be nurtured and promoted. Our computer models of human cognitive behavior indicate that explanation plays a critical role in learning. Unfortunately the educational system has been unable to foster and exploit what should be central in our schools, namely the love of learning. Primary and secondary education today face many problems. Children aren't learning the basic skills of reading writing and math. The introduction of computers in the classrooms has not provided the predicted panacea, but has instead brought problems of its own, primarily due to inadequate software for the core curriculum. Most of the available educational software is terrible. It is ineffective, costly, unproven, and inappropriate. We discuss the tremendous potential of the computer in education and offer standards for achieving high-quality educational software for all parts of the curriculum. In particular, computers offer a unique opportunity to cultivate the student's natural desire to explore and explain the world. GRA

N86-25171# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
REASONING IN REAL-TIME FOR THE PILOT ASSOCIATE: AN EXAMINATION OF A MODEL BASED APPROACH TO REASONING IN REAL-TIME FOR ARTIFICIAL INTELLIGENCE SYSTEMS USING A DISTRIBUTED ARCHITECTURE M.S. Thesis
Douglas O. Norman Dec. 1985 159 p refs
(AD-A163947; AFIT/GCS/ENG/85D-12) Avail: NTIS HC A08/MF A01 CSCL 06/4

The use of artificial intelligence (AI) techniques for pilot aiding in real-time (DOD Pilot Associate--PA) introduces some seemingly intractable problems. Most algorithms which will be used in a PA are search intensive with exponential-order-time-complexities. The thesis outlines the problem and explores the possibility of using parallel processing for minimizing the computational costs. Methods for, and results from, distributing data and functions among many processors are presented. An extension to the blackboard structure used in many AI systems called a virtual blackboard is introduced. The results and techniques are bundled into a prototype distributed data-flow constraint-network application system called DDAFCON. DDAFCON is discussed, and a flight-planning application is presented using DDAFCON. The results are discussed. It is shown that the maximum speedup due to parallel processing is bounded by the number of processors which a problem solution can accept. The thesis concludes that generalized AI structures and reasoning paradigms (specifically, deep models), although seemingly required for the performance level desired for applications such as the PA may not be realizable for many real-time applications. A change in emphasis for developing real-time AI systems is suggested. GRA

N86-25172# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
THE STRUCTURES OF DISCOURSE STRUCTURE
B. J. Grosz and C. L. Sidner Nov. 1985 71 p
(Contract N00014-85-C-0079)
(AD-A163024; BBN-6097; CSLI-85-39) Avail: NTIS HC A04/MF A01 CSCL 05/7

The development of a computational theory of discourse structure is described. The theory is based on the thesis that discourse structure is a composite of three structures: the structure of the sequence of utterances, the structure of intentions conveyed, and the attentional state. The distinction among these components is essential to provide adequate explanations of such discourse phenomena as clue words, referring expressions, and interruptions. The application of this theory to such phenomena is illustrated and the recognition of intentions in discourse discussed. GRA

N86-25173# Stanford Univ., Calif. Dept. of Computer Science.
DECISION PROCEDURES
Matthew I. Ginsberg May 1985 24 p
(Contract N00014-81-K-0004)
(AD-A163049; SU-STAN-CS-85-1064) Avail: NTIS HC A02/MF A01 CSCL 12/1

Distributed artificial intelligence is the study of how a group of individual intelligent agents can combine to solve a difficult global problem; the usual approach is to split the original problem into simpler ones and to attack each of these independently. This paper discusses in very general terms the problems which arise if the subproblems are not independent, but instead interrelate in

some way. We are led to a single assumption, which we call common rationality, that is provably optimal (in a formal sense) and which enables us to characterize precisely the communication needs of the participants in multi-agent interactions. An example of a distributed computation using these ideas is presented. GRA

N86-25174# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
STUDY OF THE EFFECTS OF DISCRETIZING QUANTITATIVE FEEDBACK THEORY ANALOG CONTROL SYSTEM DESIGNS M.S. Thesis
John S. Coucoules Dec. 1985 208 p refs
(AD-A164209; AFIT/GE/ENG/85D-10) Avail: NTIS HC A10/MF A01 CSCL 01/3

This thesis examines the feasibility and a method of extending continuous domain Quantitative Feedback Theory (QFT) flight control system designs to the discrete domain. The results of two previous QFT analog design efforts are modified for a digital implementation. The first design effort is for the KC-135 transport aircraft. Robust analog fixed compensators are designed for three different flight conditions. The second design effort is for the AFTI/F-16 aircraft. In this design, parameter variation is due to both varying flight conditions and different aircraft configurations caused by failed surfaces. GRA

N86-25175 Kansas State Univ., Manhattan.
REAL-TIME ADAPTIVE CONTROL OF A ROBOTIC MANIPULATOR USING THREE-DIMENSIONAL STEREOSCOPIC VISION FEEDBACK Ph.D. Thesis
John Robert Rasure 1985 202 p
Avail: Univ. Microfilms Order No. DA8528024

The tools necessary to analyze adaptive control with vision feedback were built in the simulation phase of the research. The implementation phase of the research validated simulation techniques and also made evident some of the limitations of robot manipular visual navigation. The vision system and control system were mathematically modeled and then simulated with C language computer programs. Modeling the geometry of 3D stereoscopic vision was a three step process: first, a camera model was developed in the form of a homogeneous transform matrix to map object coordinates to image coordinates, then this model was used to design optimal stereo camera configurations, and finally a three-dimensional vision model was developed to efficiently map the coordinates of two images to a 3-D object location. Dissert. Abstr.

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N86-25176*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NUMERICAL APPROXIMATION FOR THE INFINITE-DIMENSIONAL DISCRETE-TIME OPTIMAL LINEAR-QUADRATIC REGULATOR PROBLEM Final Report
J. S. Gibson and I. G. Rosen Mar. 1986 83 p refs Submitted for publication Prepared in cooperation with California Univ., Los Angeles and University of Southern California, Los Angeles
(Contracts NAS1-17070; NAS1-18107; Grants AF-AFOSR-0309-84; AF-AFOSR-0393-84)
(NASA-CR-178081; ICASE-86-15; NAS 1.26:178081) Avail: NTIS HC A05/MF A01 CSCL 12A

An abstract approximation framework is developed for the finite and infinite time horizon discrete-time linear-quadratic regulator problem for systems whose state dynamics are described by a linear semigroup of operators on an infinite dimensional Hilbert space. The schemes included the framework yield finite dimensional approximations to the linear state feedback gains which determine the optimal control law. Convergence arguments are given. Examples involving hereditary and parabolic systems and the vibration of a flexible beam are considered. Spline-based finite element schemes for these classes of problems, together with numerical results, are presented and discussed. Author

N86-25177# National Aeronautics and Space Administration, Washington, D.C.
OPTIMAL QUADRATIC ASYMPTOTIC DESIGN APPROACH AND ITS APPLICATIONS
Yuxian Jiang and Weini Wang May 1986 14 p refs Transl. into ENGLISH from Acta Automatica Sinica (Beijing, China), v. 11, no. 2, Apr. 1985 Transl. by SCITRAN, Inc., Santa Barbara, Calif. Original doc. was prepared by Inst. of Aeronautics, Beijing, China
(Contract NASw-4004)
(NASA-TM-88389; NAS 1.15:88389) Avail: NTIS HC A02/MF A01 CSCL 12A

The determination of weighting matrices by using the expected eigenvalues and eigenvectors in closed loop systems and the method to determine the initial matrix of the iterative solutions to the Riccati algebraic equation by the asymptotic behavior of the optimal regulator were studied. Based on this study, an optimal quadratic asymtotic design approved for linear systems was proposed. A program was written and the experimental results showed that this method is feasible. Author

N86-25178# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A THEORY FOR CLASSIFIED QUANTITIES
Carlos Jose Zamlutti Feb. 1986 19 p refs Submitted for publication
(Contract FINEP-537/CT)
(INPE-3788-PRE/883) Avail: NTIS HC A02/MF A01

A unified theory for classified quantities is proposed. The aim is to establish some mathematical bases with application to all branches of natural sciences. Author

N86-25179# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STATE ESTIMATION PROCEDURE BASED UPON THE DUALITY CONCEPT
Atair Rios Neto and Agenor deToledo Fleury Feb. 1986 6 p refs Presented at TELECON'85, Rio de Janeiro, Brazil, 10-13 Dec. 1985
(INPE-3796-PRE/891) Avail: NTIS HC A02/MF A01

The development of a new estimator for the approximate estimation of the state of nonlinear dynamic systems is presented. This estimator uses the duality between state estimation and optical control problems to create an adaptive algorithm. This algorithm is then implemented in a digital computer to estimate the orbit of a low Earth orbit satellite under simulated conditions. Numerical results are presented and discussed, as well as the theoretical aspects of the estimation algorithm. Author

N86-25180# National Aeronautical Lab., Bangalore (India). Structures Div.
MECHANICS OF FIELD-CONSISTENCY IN FINITE ELEMENT ANALYSIS: A PENALTY FUNCTION APPROACH
C. Ramesh Babu, G. Subramanian (Indian Inst. of Technology, Madras), and G. Prathap Oct. 1985 53 p refs
(NAL-TM-ST-8514) Avail: NTIS HC A04/MF A01

C(O) continuous beam, plate and shell elements are very popular. In displacement type finite formulations, the difficulties of shear locking, parasite shear, and stress oscillation are rationalized by using field consistency concepts. A priori quantitative error estimate of these difficulties can be made by using an operational procedure, the functional reconstitution technique. The mechanics of these concepts are demonstrated by using the simplest shear flexible beam element as an example. Its a priori projections are verified through digital computations. The rationale behind the use of optimal stress sampling at Gaussian points is derived directly from these arguments. Author

N86-25181# Johns Hopkins Univ., Baltimore, Md. Dept. of Mathematical Sciences.

POISSON APPROXIMATION OF BERNOULLI POINT PROCESSES AND THEIR SUPERPOSITIONS, VIA COUPLING
Alan F. Karr and Robert J. Serfling Dec. 1985 16 p refs
(Contract N00014-79-C-0801)
(AD-A163442; TR-458; ONR-TR-85-7) Avail: NTIS HC A02/MF A01 CSCL 12/1

A maximal coupling of a Bernoulli point process on an arbitrary compact space by a Poisson process is constructed. Exact computation of the variation distance between the probability laws follows as a consequence. For certain values of the parameters this coupling yields the optimal Poisson approximation of the given Bernoulli process. A procedure is derived for embedding a triangular array of Bernoulli processes within a single Poisson process. Classical Poisson limit theorems are deduced. Author (GRA)

N86-25182# Stanford Univ., Calif. Dept. of Statistics.
TESTS FOR THE EXTREME VALUE AND WEIBULL DISTRIBUTIONS BASED ON NORMALIZED SPACINGS
R. A. Lockhart, F. OReilly, and M. A. Stephens 19 Dec. 1985 25 p
(Contract N00014-76-C-0475)
(AD-A163566; SU-TR-369) Avail: NTIS HC A02/MF A01 CSCL 12/1

In this article we compare tests of the null hypothesis HO that a sample, which may be censored at one or both ends, comes from an extreme-value distribution with unknown location and scale parameters; such tests can also be used to test that observations come from a Weibull distribution with origin zero, and scale and shape parameters unknown. Such tests of HO are important in many applications, in particular in reliability theory and survival analysis. GRA

N86-25183# Wisconsin Univ., Madison. Mathemnatics Research Center.
CHARACTERIZATION OF THE CONSISTENT WEIGHTED REGRESSION ESTIMATORS Technical Summary Report
Lih-Yuan Deng Sep. 1985 26 p
(Contract DAAG29-80-C-0041)
(AD-A163605; MRC-TSR-2867) Avail: NTIS HC A03/MF A01 CSCL 12/1

The ratio estimator can be justified by a linear superpopulation model without intercept and the error variance proportional to the size of the covariate. If either of the assumptions is violated, then other estimators may be considered. We study the consistency of several estimators which are based on different assumptions about variance structure of the error. Some decompositions of the finite population are introduced. Roughly speaking, we fit a weighted regression line to the finite population with the weight chosen according to the estimator under consideration. We show that any estimators in that class, except the ratio estimator, are inconsistent unless some conditions on the population's characteristics are satisfied. Based on the decomposition, modifications can be made to get a consistent estimator. For the case of p-auxiliary variables, we characterize the class of consistent weighted least squares estimators. The result is extended to the infinite population problem using a completely different approach. GRA

N86-25184# Naval Postgraduate School, Monterey, Calif.
SURFACE CONSTRUCTION FROM PLANAR CONTOURS
Patrick G. Hogan and Michael J. Zyda Jan. 1986 51 p
(AD-A163610; NPS-52-86-002) Avail: NTIS HC A04/MF A01 CSCL 12/1

Many scientific and technical endeavors require the reconstruction of a three-dimensional solid from a collection of two-dimensional contours. One method for this reconstruction involves a procedure whereby individual pairs of contours are mapped together to form triangular surface patches. In this paper, we present an algorithm which not only handles mapping situations of simple, closed contours but also mappings of multiple contours per plane and partial contour mappings. Also included is a discussion of the algorithm's limitations and heuristics. GRA

N86-25185# Naval Postgraduate School, Monterey, Calif.
HIGHER ORDER RESIDUAL ANALYSIS FOR NONLINEAR TIME SERIES WITH AUTOREGRESSIVE CORRELATION STRUCTURES
Peter A. W. Lewis and Anthony J. Lawrance Dec. 1985 27 p
(AD-A163611; NPS-55-85-030) Avail: NTIS HC A03/MF A01 CSCL 12/1

The paper considers nonlinear time series whose second order autocorrelations satisfy autoregressive Yule-Walker equations. The usual linear residuals are then uncorrelated, but not independent, as would be the case for linear autoregressive processes. Two such types of nonlinear model are treated in some detail: random coefficient autoregression and multiplicative autoregression. The proposed analysis involves crosscorrelation of the usual linear residuals and their squares. This function is obtained for the two types of model considered, and allows differentiation between models with the same autocorrelation structure in the same class. For the random coefficient models it is shown that one side of the crosscorrelation function is zero, giving a useful signature of these processes. The non-zero features of the other side of the crosscorrelations are informative of the higher order dependency structure. In applications this residual analysis requires only standard statistical calculations, and extends rather than replaces the usual second order analysis. GRA

N86-25186# Wisconsin Univ., Madison. Mathematics Research Center.
THE CHINESE REMAINDER PROBLEM AND POLYNOMIAL INTERPOLATION Technical Summary Report
I. J. Schoenberg Nov. 1985 10 p
(Contract DAAG29-80-C-0041)
(AD-A163626; MRC-TSR-2889) Avail: NTIS HC A02/MF A01 CSCL 12/1

The Chinese Remainder Problem (Ch.R.P) is to find an integer x such that x = a sub i(mod m sub i) (i=1,...,n), where mi are pairwise relatively prime moduli and a sub i are given integers. In the 1950's I learnt orally from Marcel Riesz that the CH.R.P. is an analogue of the polynomial interpolation problem P(x sub i) = Y sub i(i=1,...,n), P(x) is a subset of pi sub n-1, and that the Ch.R.P. can be solved by an analogue of Lagrange's interpolation formula. The author now adds the remark that the Ch.R.P. can be solved, even more economically, by an analogue of Newton formula using successive divided differences. GRA

N86-25187# Wisconsin Univ., Madison. Mathematics Research Center.
IMPROVED INTERVAL BOUNDS FOR RANGES OF FUNCTIONS Technical Summary Report
L. B. Rall Nov. 1985 22 p
(Contract DAAG29-80-C-0041)
(AD-A163627; MRC-TSR-2888) Avail: NTIS HC A02/MF A01 CSCL 12/1

Evaluation of a real function f on an interval X using interval arithmetic yields an interval extension F(X) containing the range R(f;X) of f on X. Unfortunately, F(X) is sometimes excessively wider than R(f;X). Evaluation of f epsilon C1 by interval differentiation arithmetic gives F(X) and the extension F'(X) of f' on X. If F'(X) > 0 (or F'(X) < 0), then f is monotone on X = (a,b), and R(f;X) = (f(a), f(b)) (or R(f;X) = (f(b), f(a))), giving improved bounds for R(f;X). If 0 epsilon int(F'(X)), then X is divided into subintervals on which f is either guaranteed to be monotone or has possible extremal points. A Pascal-SC program for this simple algorithm is given, and numerical results are presented. As a byproduct of the computation, possible extremal points of f are isolated. GRA

N86-25188# Wisconsin Univ., Madison. Mathematics Research Center.
MAXIMUM LIKELIHOOD RECURSION AND STOCHASTIC APPROXIMATION IN SEQUENTIAL DESIGNS Technical Summary Report
C. F. J. Wu Nov. 1985 22 p
(Contract DAAG29-80-C-0041)
(AD-A163628; MRC-TSR-2890) Avail: NTIS HC A02/MF A01

CSCL 12/1

When the saving of sample size is an important consideration, sequential design of experiments is often used. By efficiently utilizing the information in the past experiments, it determines how the next experiment should be conducted. Statistical theory for sequential designs has been developed for normal and binomial variations. For the problem of determining the solution of an unknown nonlinear equation, we have developed a class of sequential design procedures that can handle very general variations described by the generalized linear models. In special cases it includes a new adaptive version of the Robbins-Monro stochastic approximation and a maximum likelihood recursion scheme for quantal responses. Its relation to the stochastic approximation and the role the link function plays are studied. Theoretical issues such as consistency, robustness, asymptotic normality and second-order properties are discussed. GRA

N86-25189# Wisconsin Univ., Madison. Mathematics Research Center.

REMARKS ON THE EXISTENCE AND UNIQUENESS OF UNBOUNDED VISCOSITY SOLUTIONS OF HAMILTON-JACOBI EQUATIONS Technical Summary Report

Michael G. Crandall and Pierre-Louis Lions Oct. 1985 34 p refs (Contract DAAG29-80-C-0041)

(AD-A163701; MRC-TSR-2875) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper is concerned with various questions about the existence and uniqueness of solutions of Hamilton-Jacobi equations in RN. The issues treated have to do with the interaction between structure properties of the Hamiltonian (in particular, continuity and growth properties), properties of the solutions and the existence and uniqueness. Uniqueness is exhibited in appropriate growth classes depending on the Hamiltonian and existence is exhibited in these classes when the assumptions are slightly strengthened. Existence results are also given under assumptions for which uniqueness fails, existence of minimal solutions is shown given the existence of a subsolution, and examples are given to indicate the sharpness of some of the results. GRA

N86-25190# Wisconsin Univ., Madison. Mathematics Research Center.

CONVERGENCE OF CUBIC SPLINE INTERPOLATION WITH THE NOT-A-KNOT CONDITION Technical Summary Report

Carl DeBoor Oct. 1985 9 p refs (Contract DAAG29-80-C-0041)

(AD-A163705; MRC-TSR-2876) Avail: NTIS HC A02/MF A01 CSCL 12/1

It is shown that cubic spline interpolation with the Not-A-Knot side condition converges to any C squared without any mesh-ratio restriction as the mesh size goes to zero. GRA

N86-25191# Wisconsin Univ., Madison. Mathematics Research Center.

A PROOF OF GRACE'S THEOREM BY INDUCTION Technical Summary Report

A. W. Goodman and I. J. Schoenberg Oct. 1985 11 p refs (Contract DAAG29-80-C-0041)

(AD-A163714; MRC-TSR-2874) Avail: NTIS HC A02/MF A01 CSCL 12/1

Grace's theorem states: Let the polynomials be apolar. If the circular region C contains all the zeros of A(z), then C must contain at least one of the zeros of B(z). By a circular region is meant either the closed interior of a circle, or the closed exterior of a circle, or a closed half-plane. This document gives a proof of Grace's theorem by mathematical induction on the degree n. GRA

N86-25192# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A COMPARISON OF ESTIMATION TECHNIQUES FOR THE THREE PARAMETER PARETO DISTRIBUTION M.S. Thesis

Dennis J. Charek Dec. 1985 121 p refs

(AD-A163831; AFIT/GSO/MA/85D-3) Avail: NTIS HC A06/MF A01 CSCL 12/1

The purpose is to compare the minimum distance estimation technique with the best linear unbiased estimation technique to determine which estimator provides more accurate estimates of the underlying location and scale parameter values for a given Pareto distribution. Two forms of the Kolmogorov, Anderson-Darling, and Cramer-von Mises minimum distance estimators are tested. A Monte Carlo methodology is used to generate the Pareto random variates and the resulting estimates. A mean square error comparison is then performed to evaluate which estimator provides the best results. Additionally, various sample sizes and shape parameters are also used to determine whether they have an influence on a given estimator's performance. GRA

N86-25193# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

MODIFIED KOLMOGOROV-SMIRNOV, ANDERSON-DARLING, AND CRAMER-VON MISES TESTS FOR THE PARETO DISTRIBUTION WITH UNKNOWN LOCATION AND SCALE PARAMETERS M.S. Thesis

James E. Porter, III Dec. 1985 184 p refs

(AD-A163837; AFIT/GSO/MA/85D-6) Avail: NTIS HC A09/MF A01 CSCL 12/1

This thesis develops goodness-of-fit tests for the Pareto distribution by generating critical value tables for the modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises statistics. These tables can be used to test whether a set of observed values follows a Pareto distribution when the location and scale parameters are unspecified and must be estimated from the observed sample data. Additionally, the power of each of the three goodness-of-fit tests is studied and compared. Finally, the functional relationship between the critical values and the Pareto shape parameter is determined. GRA

N86-25194# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A NEW METHOD FOR COMPUTING THE GENERALIZED INVERSES OF A MATRIX AND ITS APPLICATION TO THE LYAPUNOV MATRIX EQUATION M.S. Thesis

Craig F. Murray Dec. 1985 132 p refs

(AD-A163840; AFIT/GOR/MA/85D-2) Avail: NTIS HC A07/MF A01 CSCL 12/1

This thesis examines a new method for computing four generalized inverses of a matrix. This method, the ST method, is based on the careful selection of a sequence of matrix multiplications and partitionings which provide a new foundation for computing four generalized inverses. Central to this approach is the partitioning of the two submatrices, R and C, where the product of their submatrices will give the generalized inverses of interest. Thus using this new representation, the generalized inverses of a matrix can be computed in a simple and direct manner. In this work, four generalized inverses are derived and computed in a systematic manner from this representation. These results are strongly tied to the solution of the matrix equation Ax=b where the general solution is given in terms of this new representation and computational technique. The computational technique is presented with an example and also as an algorithm. Included with the algorithm is an analysis of its computer implementation. The use of one generalized inverse is used to find the solution of a Lyapunov matrix equation. GRA

N86-25195# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

SOLUTIONS OF NONLINEAR MATRIX EQUATIONS M.S. Thesis

Bruce W. Colletti Dec. 1985 116 p refs

(AD-A163841; AFIT/GOR/MA/85D-1) Avail: NTIS HC A06/MF A01 CSCL 12/1

This thesis seeks the solutions to a system of equations (equalities) in n variables by expressing the system in matrix algebraic form. Properties of the solutions to the ensuing matrix equation are investigated using similarity transformations. The three types of matrix equations to be studied are: the linear equation - AX = b; the Lypunov equation - AX - XB = C; the second-order

Riccati equation - XDX + AX + XB + C = 0; and the third-order Riccati equation = XAXBX + XCX + DX + XE + F = 0. Because adding and multiplying matrices (having multivariate polynomial entries) is tedious in practice, an interactive BASIC program is presented in the appendix. This program, which can be used on a personal computer, permits the user to perform operations on matrices having multivariate polynomial entries.
GRA

N86-25196# Ballistic Research Labs., Aberdeen Proving Ground, Md.
A FUZZY SET APPROACH TO VULNERABILITY ANALYSIS AD-A163921 BRL-TR-2697 HC A03/MF A01
Palmer R. Schlegel, Ralph E. Shear, and Malcolm S. Taylor Dec. 1985 37 p refs
(AD-A163921; BRL-TR-2697) Avail: NTIS HC A03/MF A01 CSCL 12/1

This document illustrates how vagueness or uncertainty can be modeled by fuzzy sets and how this uncertainty is reflected in the final measure of vulnerability. Its emphasis will be on the computation of vulnerable area of a surrogate system with uncertainty present in the cell probabilities. The uncertainty in the cell probabilities can be attributed to uncertainty in assigning component kill probabilities, to error in engineering judgement in determining critical areas of components and component kill criteria and to unknown synergistic effects. Other contributions to uncertainty are of course present, starting from the target description through a myriad of subjective decisions and engineering judgements inherent in the vulnerability analysis. For the purpose of completeness and comparison, a point estimate of the vulnerable area of the surrogate system will also be determined as it is currently done in vulnerability analysis. A point and interval estimate of the vulnerable area will be determined by a statistical procedure known as bootstrapping. Finally, a fuzzy vulnerable area will be calculated and the different approaches compared.
Author (GRA)

N86-25197# Massachusetts Univ., Amherst.
[CONNECTING MATHEMATICS, SCIENCE AND HIGH TECHNOLOGY: RESEARCH ON SOLUTIONS TO NONLINEAR PARTIAL DIFFERENTIAL EQUATIONS, BIFURCATION PHENOMENA, AND CONSTRUCTIVE METHODS FOR IMPLEMENTING THE CALCULUS OF VARIATIONS FOR RELEVANT, PHYSICAL PROBLEMS] Final Report, 29 Jan. 1984 - 28 Jul. 1985
M. S. Berger 4 Sep. 1985 4 p
(Grant AF-AFOSR-0059-84)
(AD-A162827; AFOSR-85-1109TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The titles of eleven research papers written by an Air Force investigator are as follows: Vortex Phenomena; Some Nonlinear Analytic Aspects of VLSI Semiconductor Device Modeling; the Confinement Problem in Nonlinear Gauge Theories and New Ideas in the Calculus of Variations in the Large; and Variational Principles for Equilibrium Figures of Fluid Without Symmetry Assumptions.
GRA

N86-25198# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
NUMERICAL GRID GENERATION FOR PARABOLIC PARTIAL DIFFERENTIAL EQUATIONS USING MARCHING TECHNIQUES M.S. Thesis
Steven G. Miller Dec. 1985 142 p refs
(AD-A164020; AFIT/GA/AA/85D-7) Avail: NTIS HC A07/MF A01 CSCL 20/4

Two- and three-dimensional surface normal grids are generated in Cartesian coordinates around a supersonic/hypersonic waverider configuration using parabolic partial differential equations. The elliptic partial differential equations for grid generation are parabolized in the xi direction in two dimesions, and in the xi and zeta directions in three dimensions. This is consistent with spatial marching flow solutions. The parabolized grid equations march in the xi direction for two dimensions and in both the xi and zeta directions for three dimensions, without iteration. The following problems are investigated: describing the boundary points, generating grids around the waverider's wing tip, using approximations to the elliptic grid generation equations too far downstream around a convex corner, and grid crossover in concave regions when orthogonality is specified. The degree of grid smoothing in the marching directions is related to the positioning of the approximations to the elliptic grid generation equations. Highly stretched surface orthogonal grids are accurately and efficiently generated without grid embedding for high Reynold's number flows.
GRA

N86-25199# Naval Postgraduate School, Monterey, Calif.
ABSOLUTE BOUNDS ON SET INTERSECTION AND UNION SIZES FROM DISTRIBUTION INFORMATION
Neil C. Rowe Sep. 1985 51 p refs
(AD-A164025; NPS52-85-014) Avail: NTIS HC A04/MF A01 CSCL 09/2

Estimation of set intersection and union sizes is important for access method selection for a database. Absolute bounds on sizes are often much easier to compute than size estimates, requiring no distributional or independence assumptions, and can answer many of the same needs. We present a large compendium of quick closed-form bounds on set intersection and union sizes, each applying to a different situation; they can be expressed as rules, and managed by rule-based or knowledge-base architecture. These methods use general-purpose statistics precomputed on the data, and exploit homomorphisms (onto mappings) of the data items onto distributions that can be more easily analyzed. Our methods can be used anytime, but tend to work best when there are strong or complex correlations in the data. This circumstance is poorly addressed by the standard methods of independence-assumption and distributional-assumption estimates, and hence our methods fill a need.
GRA

N86-25200# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
PRELIMINARY KALMAN FILTER DESIGN TO IMPROVE AIR COMBAT MANEUVERING TARGET ESTIMATION FOR THE F-4E/G FIRE CONTROL SYSTEM M.S. Thesis
Ross B. Anderson Dec. 1985 449 p refs
(AD-A164034; AFIT/GE/ENG/85D-2) Avail: NTIS HC A19/MF A01 CSCL 19/5

Currently, the F-4E/G uses a Wiener-Hopf filter for estimating target position, velocity, and acceleration during air combat maneuvering. As implemented, the errors between the actual target variables and the estimate of these variables are too large. The purpose of this study is to evaluate the feasibility of replacing the Wiener-Hopf filter with a Kalman filter in order to obtain better estimates. The evaluation is made by first designing an appropriate preliminary design Kalman filter and then testing the design through a Monte Carlo computer simulation analysis. The computer simulation results indicate that the Kalman filter is capable of significantly outperforming the Wiener-Hopf filter and as such should be developed into a final design. The Kalman filter contains nine states (three relative target position, three total target velocity, and three total target acceleration states). Filter propagation is based on linear time-invariant dynamics primarily because of the limited capabilities of the on-board aircraft computer. The linear dynamics permits propagation by a state transition matrix. Discrete-time sampled-data designs are included.
Author (GRA)

N86-25201 Texas Univ., Austin.
MOTION IN THE RESTRICTED PROBLEM OF THREE BODIES FOR SMALL VALUES OF THE MASS PARAMETER Ph.D. Thesis
Ronald Glenn Hopkins 1985 219 p
Avail: Univ. Microfilms Order No. DA8527579

Many applications of the restricted problem of three bodies involve planetary systems, asteroids, or ring particles, where the mass parameter is extremely small in value. The third body moves about the larger primary on an approximately circular orbit, perturbed by the smaller primary. The nonlinear differential equations of motion for such an orbit may be written in terms of

deviations from a constant reference orbit. By performing an expansion in the dependent variables and truncating terms of second order and higher, a set of linear, inhomogeneous differential equations of motion is produced. Using an infinite series expansion, an analytic solution is obtained which describes the motion of the third body. The necessary initial conditions are derived from those of the circular restricted problem, along with the constants which define the reference orbit. The solution is rewritten in a simpler and more readily usable form. An analysis is performed of the types of motion resulting from different initial conditions and values of the mass parameter. The special conditions required to produce mixed secular, rather than periodic motion, are also discussed, along with examples of such orbits. Dissert. Abstr.

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N86-25202# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
KALMAN FILTERING STATE NOISE ADAPTIVE ESTIMATION
Atair Rios Neto and Helio Koiti Kuga Feb. 1986 6 p refs Presented at TELECON '85, Rio de Janeiro, Brazil, 10-13 Dec. 1985
(INPE-3790-PRE/885) Avail: NTIS HC A02/MF A01

In the presence of estimates divergence due to errors in system dynamics modelling and to algorithm numerical ill-conditioning, Kalman filter usefulness is serously impaired. A procedure to estimate the state noise level adaptively and in real time in order to represent the errors and to prevent divergence is proposed. The adequate noise level is adjusted by using a criterion of statistical consistency between estimated errors and observation residues. Results of preliminary tests, in the case of artificial satellite orbit determination in real time, are presented and show the procedure capability of avoiding divergence and of giving results of acceptable accuracy. Author

N86-25203# Wisconsin Univ., Madison. Mathematics Research Center.
BIAS AND EFFICIENCY OF THE CONSISTENT WEIGHTED REGRESSION ESTIMATORS IN FINITE POPULATION SAMPLING HC A03/MF A01 Technical Summary Report
Lih-Yuan Deng Sep. 1985 27 p
(Contract DAAG29-80-C-0041)
(AD-A163601; MRC-TSR-2870) Avail: NTIS HC A03/MF A01 CSCL 12/1

The leading terms of the bias of the ratio and regression estimators are known to be of order n to the minus 1 power. We use a finite population decomposition to give a different expression for the leading term of the bias. Fitting a regression line to the finite population, we show that the intercept of the regression line causes the bias of the ratio estimator. Fitting a quadratic regression to the finite population, we show that the bias of the regression estimator is caused by the quadratic term. We also give a compact and intuitive formula for the leading term of the bias of the weighted regression estimators for p-auxiliary variables. Using the same decomposition, we can rewrite the variance formula of some popular estimators in terms of some simple and interpretable population characteristics. We prove that under simple random sampling scheme the unweighted regression estimator is the most efficient estimator. The extension for the p-auxiliary variates is also given. GRA

N86-25204# Florida State Univ., Tallahassee. Dept. of Statistics.
A TEST FOR PROGRAM EFFECT IN THE ABSENCE OF A PROPER CONTROL GROUP
Eric S. Tollar Sep. 1985 19 p refs
(Contract DAAG29-82-K-0168)
(AD-A163783; FSU-STATISTICS-M710; TR-D-81-ARO; ARO-19367.33-MA) Avail: NTIS HC A02/MF A01 CSCL 12/1

A statistical method is proposed to analyze certain designs for program effect when no proper control group is present. It is shown that under certain partially verifiable assumptions the data can be analyzed by standard analysis of variance techniques. If these assumptions are doubtful, then a statistic is proposed which is shown to have an asymptotic t distribution. The analysis is then carried out on some research data. GRA

N86-25205# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A COMPARISON OF ESTIMATION TECHNIQUES FOR THE TWO PARAMETER CAUCHY DISTRIBUTION M.S. Thesis
John O. Sours Dec. 1985 101 p refs
(AD-A163833; AFIT/GSO/MA/85D-7) Avail: NTIS HC A06/MF A01 CSCL 12/1

Minimum distance estimators are compared to the maximum likelihood estimator of the location and scale parameters of the two parameters Cauchy distribution. Statistical sample sizes of 6,8,10,12, and 16 are randomly drawn from a Cauchy distribution and used to estimate the parameters by the maximum likelihood method. Minimum distance techniques are then used to try to improve upon the maximum likelihood estimates. One thousand samples for each sample size are generated and the mean squared error and relative efficiencies are computed. Comparison of the two methods is done by comparing the relative efficiencies. Both censored and non-censored samples are used to compute the minimum distance estimates. GRA

N86-25206# Ballistic Research Labs., Aberdeen Proving Ground, Md.
INTRODUCTION TO KERNEL DENSITY ESTIMATION Final Technical Report
Wendy A. Winner Dec. 1985 90 p refs
(AD-A163920; BRL-TR-2705) Avail: NTIS HC A05/MF A01 CSCL 12/1

Kernel density estimators are one technique for producing nonparametric estimates of a sample's underlying probability density function. Although there are numerous kernel functions, the reader is only introduced to the Gaussian, truncated Gaussian, mode centering Lognormal and median centering Lognormal kernels. These kernels are applied to two samples from the Fire Support Team (FIST) Force Development Testing and Experimentation 2 conducted by the US Army Field Artillery Board (Fort Sill, OK), at Fort Riley, KS, during April and May 1984. Analysis of the performance of the Gaussian and truncated Gaussian kernels is achieved by applying a recursive formula, developed by Richard A. Tapia and James R. Thompson, optimizing the kernel function's smoothing parameter for the FIST FDT&E II samples and for Monte Carlo simulations. Author (GRA)

N86-25207# Stanford Univ., Calif. Lab. for Computational Statistics.
EXPLORATORY PROJECTION PURSUIT
Jerome H. Friedman Nov. 1985 45 p
(Contract N00014-83-K-0472)
(AD-A163019; SU-LCS-TR-18) Avail: NTIS HC A03/MF A01 CSCL 12/1

Exploratory projection pursuit is concerned with finding relatively highly revealing lower dimensional projections of high dimensional data. The intent is to discover views of the multivariate data set that exhibit nonlinear effects clustering, concentrations near nonlinear manifolds - that are not captured by the linear correlation structure. A new algorithm for this purpose is presented that has both statistical and computational advantages over previous methods. A connection to density estimation is established. Examples are presented and issues related to practical application are discussed. GRA

N86-25208# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A MODIFIED KOLMOGOROV-SMIRNOV, ANDERSON-DARLING, AND CRAMER-VON MISES TEST FOR THE CAUCHY DISTRIBU-

TION WITH UNKNOWN LOCATION AND SCALE PARAMETERS M.S. Thesis
Frank Ocasio Dec. 1985 56 p refs
(AD-A164204; AFIT/GSO/MA/85D-5) Avail: NTIS HC A04/MF A01 CSCL 12/1

The Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises critical values are generated for the Cauchy distribution. The critical values are used for testing the null hypothesis that a set of observations follow a Cauchy distribution when the location and scale parameters are unknown and estimated from the sample. A Monte Carlo simulation, using 5000 repetitions, was used to generate the critical values for sample sizes of 5(5)30 and 50. A power study was performed using Monte Carlo simulation for the Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises goodness of fit tests. Sample sizes of 5, 15, 25 and 50 were used for six alternate distributions, for alpha levels of .05 and .01. Analyzing by sample size shows very poor power for a sample size of five. As the sample size increases so does the power, so that at a sample size of fifty, the powers against three of the six distributions is .5 or better. Among the three tests, the Kolmogorov-Smirnov is consistently more powerful, regardless of sample size or alpha level. Author (GRA)

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

No abstracts in this category.

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N86-25209# Wisconsin Univ., Madison. Mathematics Research Center.
A CONVERGENCE THEOREM FOR NEWTON'S METHOD IN BANACH SPACES Technical Summary Report
Tetsuro Yamamoto Oct. 1985 26 p
(Contract DAAG29-80-C-0041)
(AD-A163625; MRC-TSR-2879) Avail: NTIS HC A03/MF A01 CSCL 12/1

To find sharper error bounds for iterative solution of nonlinear equations under assumptions as weak as possible is of basic importance in numerical analysis. This paper gives a convergence theorem for Newton's method in Banach spaces which improves the theorems of Kantorovich, Lancaster and Ostrowski. The error bounds obtained improve the recent results of Potra. GRA

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N86-25210# Naval Surface Weapons Center, Silver Spring, Md.
UNIFORM TRANSVERSE MAGNETIC FIELD INSIDE A LONG CYLINDER
K. T. Nguyen and H. S. Uhm 17 Sep. 1985 13 p refs
(AD-A163459; AD-E401440; NSWC/MP-85-466) Avail: NTIS HC A02/MF A01 CSCL 20/3

For applications where uniform transverse magnetic field is required over a substantial distance, the use of dipole magnets can be quite cumbersome. This illustrative article presents a simple technique to achieve a uniform and uniaxial transverse magnetic field inside a long cylinder, which can be easily carried out. GRA

N86-25211# Wisconsin Univ., Madison. Mathematics Research Center.
ON THE TWO-PHASE STEFAN PROBLEM WITH INTERFACIAL ENERGY AND ENTROPY Technical Summary Report
Morton E. Gurtin Dec. 1985 70 p refs
(Contracts DAAG29-82-K-0002; DAAG29-80-C-0041; Grant NSF DMS-84-04116)
(AD-A163715; MRC-TSR-2894) Avail: NTIS HC A04/MF A01 CSCL 20/13

The classical Stefan theory for the melting of a solid or the freezing of a liquid is too simplistic to describe phenomena such as supercooling, in which a liquid supports temperatures below its freezing point, or superheating, the analog for solids, or dendritic growth, in which simple shapes evolve to complicated tree-like structures. This paper develops a general theory for two-phase phenomena of this type. It develops partial differential equations satisfied in the phase regions and free-boundary conditions satisfied on the interface between phases, and gives arguments which indicate that the resulting boundary-value problems predict the formation of dendrites. GRA

N86-25212# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
QUANTUM THEORY OF ION MOTION AND LASER COOLING IN A RADIO FREQUENCY QUADRUPOLE TRAP M.S. Thesis
Ann Laurie Wells Dec. 1984 51 p refs
(AD-A163838; AFIT/GEP/PH/84D-12) Avail: NTIS HC A04/MF A01 CSCL 07/4

The problem of ion motion and laser cooling in a radio frequency quadrupole trap is considered. It is shown by a simple numerical calculation that for ion motion in the absence of laser cooling the effect of the time varying potential v(R-bar)cos(Omega x t) can be approximated by a time independent effective potential whenever the frequency of oscillation of the electric field, Omega is sufficiently greater than a resonant frequency, (Omega)squared = (sq. root of (2) times eVo)/M were e is the electronic charge, Vo is the maximum potential applied to the trap electrodes, and M is the mass of the ion. Equations for the Hamiltonian matrix elements in the presence of laser cooling, in the Lambe-Dicke limit are derived and studied to determine the cooling transitions. The equations of motion for the density matrix in the Lambe-Dicke limit are derived using a simple representation of spontaneous emission. Author (GRA)

N86-25213# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
ELECTRON MICROSCOPY OBSERVATION OF ELECTRO-TRANSPORT M.S. Thesis
James V. Maskowitz and William E. Rhoden Dec. 1985 181 p refs
(AD-A164107; AFIT/GE/ENG/85D-25) Avail: NTIS HC A09/MF A01 CSCL 20/3

An investigation of electromigration has resulted in the development of apparatus and test vehicles for use in conducting research in situ both in the scanning and transmission electron microscope (SEM and TEM) respectively. The unique design of test vehicles and modification of equipment allows for the experimental use of a prototype Joule-Thompson microminiature refrigerator. The refrigerator inside the SEM allows for the direct observation of electromigration experiments while controlling the temperature of the test vehicle. Research was performed in a temperature range lower than any previous effort (93K to 373K). Results agree with published literature. The patent-pending design and fabrication of the TEM specimen probe and its associated test vehicles provides the means for conducting in situ research into the crystalline structures and crystallographic changes associated with electromigration. The design provides the previously unattainable ability to monitor structure changes during the electromigration process in a non-contaminating environment which exists in the TEM. Results agree with published literature. GRA

N86-25214 Texas Univ., Austin.
PARTICLE SIMULATION OF LOW FREQUENCY FLUCTUATIONS IN A SHEARED MAGNETIC FIELD Ph.D. Thesis
Richard Dwayne Sydora 1985 286 p
Avail: Univ. Microfilms Order No. DA8527654

The tools of particle simulation are used to investigate the physics of density gradient-driven low frequency fluctuations in a sheared magnetic field. This is important for the understanding of anomalous plasma losses in toroidal confinement devices. Two types of fluctuations are studied. The first is the electrostatic drift wave in a sheared magnetic field. The existence of absolutely stable drift wave eigenmodes, localized about a single mode rational surface, is established in the sheared slab geometry. From the simulation results in the strong shear limit the eigenmode frequency and mode structure agree with the linear theory. The second kind of fluctuation studied is the resistive interchange (g) mode in a sheared magnetic field. The saturation and nonlinear evolution of the instability is compared in single and multiple rational surface configurations. Dissert. Abstr.

71 ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see *45 Environment Pollution.*

N86-25215*# Bionetics Corp., Hampton, Va.
PREDICTION OF THE FAR FIELD NOISE FROM WIND ENERGY FARMS
Kevin P. Shepherd and Harvey H. Hubbard Apr. 1986 34 p refs
(Contract NAS1-16978)
(NASA-CR-177956; NAS 1.26:177956) Avail: NTIS HC A03/MF A01 CSCL 20A

The basic physical factors involved in making predictions of wind turbine noise and an approach which allows for differences in the machines, the wind energy farm configurations and propagation conditions are reviewed. Example calculations to illustrate the sensitivity of the radiated noise to such variables as machine size, spacing and numbers, and such atmosphere variables as absorption and wind direction are presented. It is found that calculated far field distances to particular sound level contours are greater for lower values of atmospheric absorption, for a larger total number of machines, for additional rows of machines and for more powerful machines. At short and intermediate distances, higher sound pressure levels are calculated for closer machine spacings, for more powerful machines, for longer row lengths and for closer row spacings. E.A.K.

N86-25216*# United Technologies Research Center, East Hartford, Conn.
HELICOPTER ROTOR NOISE DUE TO INGESTION OF ATMOSPHERIC TURBULENCE Final Report
John C. Simonich, Roy K. Amiet, Robert H. Schlinker, and Edward M. Greitzer (Massachussetts Inst. of Technology, Cambridge) Washington NASA May 1986 150 p refs
(Contract NAS1-17096)
(NASA-CR-3973; NAS 1.26:3973) Avail: NTIS HC A07/MF A01 CSCL 20A

A theoretical study was conducted to develop an analytical prediction method for helicopter main rotor noise due to the ingestion of atmospheric turbulence. This study incorporates an atmospheric turbulence model, a rotor mean flow contraction model and a rapid distortion turbulence model which together determine the statistics of the non-isotropic turbulence at the rotor plane. Inputs to the combined mean inflow and turbulence models are controlled by atmospheric wind characteristics and helicopter operating conditions. A generalized acoustic source model was used to predict the far field noise generated by the non-isotropic flow incident on the rotor. Absolute levels for acoustic spectra and directivity patterns were calculated for full scale helicopters, without the use of empirical or adjustable constants. Comparisons between isotropic and non-isotropic turbulence at the rotor face demonstrated pronounced differences in acoustic spectra. Turning and contraction of the flow for hover and low speed vertical ascent cases result in a 3 dB increase in the acoustic spectrum energy and a 10 dB increase in tone levels. Compared to trailing edge noise, turbulence ingestion noise is the dominant noise mechanism below approximately 30 rotor harmonics, while above 100 harmonics, trailing edge noise levels exceed turbulence ingestion noise by 25 dB. Author

N86-25217*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
AN ESTIMATE OF THE ENROUTE NOISE OF AN ADVANCED TURBOPROP AIRPLANE NASA-TM-87302 E-3020 NAS 1.15: 87302 HC A02/MF A01
James H. Dittmar Apr. 1986 24 p refs
(NASA-TM-87302; E-3020; NAS 1.15:87302) Avail: NTIS HC A02/MF A01 CSCL 20A

The enroute noise of an Advanced Turboprop powered aircraft was estimated. The measured noise levels were roughly equivalent in annoyance to the noise 15.24 m from an automobile traveling at 80 km/h. It is felt that these levels would not illicit noise complaints from urban areas during the day but might be a slight annoyance in rural areas or in urban areas at night. Although it is not felt that the enroute noise is a major problem, it is indicated that a reduction in the enroute noise could improve the acceptability of advance turboprop airplanes. Author

N86-25218*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
AN EXPERIMENTAL INVESTIGATION OF REDUCING ADVANCED TURBOPROP CABIN NOISE BY WING SHIELDING
James H. Dittmar 1986 37 p refs Presented at the 10th Aeroacoustics Conference, Seattle, Wash., 9-11 Jul. 1986; sponsored by AIAA
(NASA-TM-87112; E-2713; NAS 1.15:87112) Avail: NTIS HC A03/MF A01 CSCL 20A

An experimental investigation was undertaken to determine if wing shielding could reduce the noise impacting the fuselage of an advanced turboprop airplane. Four wings were tested behind two eight-bladed propeller models. Significant shielding of the propeller noise was observed and a particular wing-propeller geometry was identified to provide the most shielding. Specifically, an up-inboard rotation would be needed for a low-wing airplane and a down-inboard rotation for a high-wing airplane. As the axial Mach number was increased, the position where the shielding starts moved farther downstream. This shift in the start of shielding was roughly a straight line with respect to Mach number between $M = 0.7$ and $M = 0.8$. At $M = 0.85$ the start of shielding does not shift any farther downstream. A simple barrier noise-reduction model gave the same trends with transducer positions as did the data, and, if corrected for Mach number shift, the model might be used to provide estimates of the wing shielding. Besides providing a barrier to the noise reaching the shielded area, the wing also reflects some of the noise back onto the unshielded area. This can make the noise difference between the unshielded and shielded areas of the fuselage larger than would be expected by simple wind shielding. Author

N86-25219*# United Technologies Corp., East Hartford, Conn.
JET SHIELDING OF JET NOISE Final Report
John C. Simonich, Roy K. Amiet, and Robert H. Schlinker Washington NASA Apr. 1986 182 p refs
(Contract NAS1-16689)
(NASA-CR-3966; NAS 1.26:3966) Avail: NTIS HC A09/MF A01 CSCL 20A

An experimental and theoretical study was conducted to develop a validated first principle analysis for predicting the jet noise reduction achieved by shielding one jet exhaust flow with a second, closely spaced, identical jet flow. A generalized fuel jet noise analytical model was formulated in which the acoustic radiation from a source jet propagates through the velocity and temperature discontinuity of the adjacent shielding jet. Input

variables to the prediction procedure include jet Mach number, spacing, temperature, diameter, and source frequency. Refraction, diffraction, and reflection effects, which control the dual jet directivity pattern, are incorporated in the theory. The analysis calculates the difference in sound pressure level between the dual jet configuration and the radiation field based on superimposing two independent jet noise directivity patterns. Jet shielding was found experimentally to reduce noise levels in the common plane of the dual jet system relative to the noise generated by two independent jets. Author

N86-25220*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AIRCRAFT NOISE PREDICTION PROGRAM THEORETICAL MANUAL: PROPELLER AERODYNAMICS AND NOISE
William E. Zorumski, ed. and Donald S. Weir, ed. (PRC Kentron, Inc., Hampton, Va.) Jun. 1986 256 p refs 3 Vol.
(NASA-TM-83199; L-15937; NAS 1.15:83199) Avail: NTIS HC A12/MF A01 CSCL 20A

The prediction sequence used in the aircraft noise prediction program (ANOPP) is described. The elements of the sequence are called program modules. The first group of modules analyzes the propeller geometry, the aerodynamics, including both potential and boundary-layer flow, the propeller performance, and the surface loading distribution. This group of modules is based entirely on aerodynamic strip theory. The next group of modules deals with the first group. Predictions of periodic thickness and loading noise are determined with time-domain methods. Broadband noise is predicted by a semiempirical method. Near-field predictions of fuselage surface pressrues include the effects of boundary layer refraction and scattering. Far-field predictions include atmospheric and ground effects. Author

N86-25221# Naval Underwater Systems Center, New London, Conn.
EFFECTS OF CONVERGENCE ZONE MULTIPATH ON CROSS-CORRELATION
Walter S. Hauck, III, E. R. Robinson, and Azizul H. Quazi 7 Jan. 1986 18 p refs
(AD-A163650; NUSC-TD-7563) Avail: NTIS HC A02/MF A01 CSCL 20/1

The object of the current study is to examine the effect of CZ multipath on cross-correlation of frequency hopped pulses. The sensitivity of the correlation to source or receiver depth and the location of the source within a convergence zone is examined using the Generic Sonar Model. GRA

N86-25222# Naval Research Lab., Washington, D. C.
A TRANSDUCER FOR BOTTOM-SCATTERING MEASUREMENTS Final Report, Jan. 1981 - Jan. 1982
A. C. Tims, T. A. Henriquez, and J. G. Williams 31 Dec. 1985 25 p refs
(AD-A163987; NRL-MR-5616) Avail: NTIS HC A02/MF A01 CSCL 17/1

An omnidirectional 25-kHz transducer has been designed for use in bottom-scattering measurements. The transducer can be used either as a projector or, when fitted with a preamplifier, as a hydrophone. The requirements for the design are presented and solved with mathematical modeling and analysis. A comparison between theory and measured performance is given. The design of a low-noise preamplifier with integrated circuits is described. GRA

N86-25223 Washington Univ., St. Louis, Mo.
PHASE-INSENSITIVE DETECTION AND THE METHOD OF MOMENTS FOR ULTRASONIC TISSUE CHARACTERIZATION Ph.D. Thesis
Patrick Henry Johnston 1985 287 p
Avail: Univ. Microfilms Order No. DA8529972

This thesis addresses the physics underlying the propagation and detection of ultrasound in the presence of an inhomogeneous medium such as soft tissue. As an approach toward the problem of quantitative characterization of an inhomogeneous medium using ultrasound, experimental methods are explored for extracting information about the medium from changes in the spatial distribution and the frequency content of ultrasonic energy transmitted through or scattered by the medium. Emphasis is placed upon techniques based on phase-insensitive detection implemented by means of a two-dimensional array of point-like receiving elements whose output is characterized using the method of moments. The two-dimensional pseudo-array approach to phase-insensitive detection is demonstrated in a variety of transmission measurements. Dissert. Abstr.

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N86-25224# Kansas State Univ., Manhattan.
INTRODUCTION TO FREE ATOMS AND PARTICLES
Kenneth J. Klabunde Jan. 1986 25 p refs
(Contract N00014-85-K-0821)
(AD-A163586; TR-3) Avail: NTIS HC A02/MF A01 CSCL 07/4

An introduction to materials, uses, and methods of free atoms and particles is presented. High temperature evaporation methods such as resistive heating, electron beam, lasers, sputtering and magnetron sputtering, and induction heating are discussed. Chemical reactivity patterns of free atoms and particles are outlined. Much data on melting point, boiling point, evaporation temperatures, vapor composition, and films and their uses are given. GRA

N86-25225# Drexel Univ., Philadelphia, Pa. Dept. of Mechanical Engineering and Materials Sci.
POSITRON ANNIHILATION STUDIES OF VERY FINE STRUCTURED MATERIALS Final Report, 1 Jul. - 31 Aug. 1985
Phillip L. Jones 17 Dec. 1985 13 p refs
(Contract DAAG29-85-K-0197)
(AD-A163822; ARO-23141.1-MS) Avail: NTIS HC A02/MF A01 CSCL 20/3

A Fe-Nd-B permanent magnet alloy (Crumax 30) has been evaluated as a function of thermal treatment by means of positron annihilation lifetime spectroscopy. The results of this preliminary study indicate that the room temperature lifetime spectra can be accurately modeled using either a two-component or a partially constrained three-component fit. The thermally-induced variations in lifetime spectra can be correlated with the concomitant decrease in magnetic coercivity in a manner that is consistent with thermally-induced microstructural transformations reported in the literature. The demonstrated sensitivity of positron annihilation lifetime spectroscopy to thermally-induced changes in both microstructure and magnetic coercivity suggests that a more thorough systematic positron annihilation evaluation of Fe-R-B alloys could provide further insight into the relationship between processing, structure and magnetic properties. GRA

N86-25226# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
QUANTUM MECHANICAL ATOMIC ENERGY OPERATOR M.S. Thesis
William Roc White Dec. 1984 75 p refs
(AD-A163839; AFIT/GEP/PH/84D-13) Avail: NTIS HC A04/MF A01 CSCL 20/10

Various forms of the atomic Hamiltonian are examined as the energy operator for an atom in an electromagnetic field, using the semiclassical approach. The unperturbed Hamiltonian and the full atomic Hamiltonian have been favorite choices in the past, but these give different predictions if treated as the energy operator. The A dot p versus r dot e controversy is also examined and clarified. Both choices have conflicts with observations or physical laws. Gauge invariance and the Stark effect are considered. The multipole Hamiltonian is presented and argued as the correct energy operator. Calculations for three photon absorption in a two level atom, using time dependent perturbation theory, yield

significant differences in the predictions for absorption rate and resonant frequency. GRA

N86-25227# Wisconsin Univ., Madison. Dept. of Chemistry.
TIME AND STATE RESOLVED STUDIES OF MOLECULAR DECOMPOSITION Final Report, 1 Aug. 1982 - 31 Jul. 1985
F. F. Crim 12 Dec. 1985 21 p refs
(Contract DAAG29-82-K-0150)
(AD-A163881; ARO-19294.3-CH) Avail: NTIS HC A02/MF A01 CSCL 07/4

The combination of laser excitation of overtone vibrations with time resolved spectroscopic detection of reaction products provides uniquely detailed data on the rates and disposal of energy into products in unimolecular decompositions. The decomposition of a cyclic peroxide, tetramethyldioxetane, is the first example of a vibrational overtone initiated reaction studied in a free jet expansion, where the thermal energy content of the reacting molecules is small. Low pressure gas phase data on hydrogen peroxide reveal the partitioning of the excess energy of the reaction in the OH products and provide new data on the vibrational overtone spectroscopy of this molecule. A new molecular beam apparatus has been constructed for extending these studies to a wider range of molecules using additional detection techniques. GRA

N86-25228# Wayne State Univ., Detroit, Mich. Dept. of Physics.
DISSOCIATIVE ELECTRON ATTACHMENT TO ROVIBRATIONALLY EXCITED MOLECULES Annual Technical Report, 1 Aug. 1984 - 30 Sep. 1985
J. M. Wadehra 16 Apr. 1986 11 p
(Grant AF-AFOSR-0143-84)
(AD-A163065; AFOSR-85-1133TR; ATR-1) Avail: NTIS HC A02/MF A01 CSCL 20/8

The aim of this project is to investigate the dependence of the cross sections for dissociative electron attachment to a molecule on the initial rovibrational state of the molecule. An enhancement of the cross section results in the enhancement of the rate of production of negative ion beams. Preliminary investigations reveal that for lithium dimers, Li(2), the peak attachment cross sections can increase by almost an order of magnitude if the molecule is initially vibrationally excited to the v = 1 level. Excitation to higher vibrational levels would result in further enhancement of the attachment rates. As part of present investigations, the cross sections for vibrational excitation of various molecules, using both resonant and nonresonant mechanisms is calculated. GRA

N86-25229# Washington Univ., Seattle. Dept. of Chemistry.
HIGH TEMPERATURE GAS ENERGY TRANSFER Final Summary Report, 1975 - 1985
B. S. Rabinovitch 16 Dec. 1985 11 p
(Contract N00014-75-C-0690)
(AD-A163020) Avail: NTIS HC A02/MF A01 CSCL 20/8

A summary of a report on high temperature gas energy transfer discusses the following topics: (1) development of a new method called the Diffusion Cloud Method for the study of intermolecular vibrational energy transfer in reacting unimolecular systems; (2) development of the theory and method of a new technique called the Variable Encounter Method for the study of sequential vibrational energy transfer between gas molecules and hot surfaces; (3) a critique of the exact vibrational state computational algorithmn of Beyer-Swinehart-Stein-Rabinovitch was given; (4) a theoretical illustration of a model for V-T,R vibrational energy transfer restricted by angular momentum conservation was given; and (5) theoretical treatment of a Boltzmann strong collision model has led to generalizations on energy transfer efficiency as a function of both molecule size ambient temperature and hot molecule energy level. GRA

N86-25230# Washington Univ., Seattle. Dept. of Chemistry.
VIBRATIONAL ENERGY TRANSFER AT A LIQUID GALLIUM SURFACE. ACTIVATION OF UNIMOLECULAR CYCLOBUTENE ISOMERIZATION
D. A. Oswald, W. B. Nilsson, and B. S. Rabinovitch 26 Dec. 1985 17 p
(Contract N00014-75-C-0690)
(AD-A163023; TR-33) Avail: NTIS HC A02/MF A01 CSCL 07/4

Single collision vibrational energy transfer for a canonical ensemble (t=300K) of cyclobutene molecules at a heated liquid gallium surface has been studied from 450K to 700K. Transport above the reaction threshold for isomerization to butadiene (E sub 0 = 32.4 kcal/mole) was used as the criterion for efficiency of vibrational energy accommodation. The efficiency was found to fall below strong collider behavior above 625K. Evidence of surface catalysis became important below 525K. The observed behavior is reminiscent of that found previously for other liquid (Sn) and solid (Au) metal surfaces. GRA

N86-25231# Massachusetts Inst. of Tech., Cambridge.
ENERGY AND CHEMICAL CHANGE Final Report, 1981 - 1985
R. D. Levine and J. L. Kinsey 20 Nov. 1985 15 p refs
(Grant AF-AFOSR-0030-81)
(AD-A164147; AFOSR-86-0030TR) Avail: NTIS HC A02/MF A01 CSCL 07/4

The introduction and application of an algebraic approach to molecular structure and dynamics is reviewed. The key points which are discussed are the motivation and basic elements of the formalism, applications to vibrational overtone spectroscopy of triatomic molecules, the interpretation of the approach in geometrical terms, the extension to scattering and to time dependent phenomena, the characterization of quantum chaos, dynamic surprisal synthesis and stochastic processes. GRA

N86-25232# Aerospace Corp., Los Angeles, Calif. Chemistry and Physics Lab.
A QUANTUM MECHANICAL INVESTIGATION OF VIBRATIONAL ENERGY TRANSFER IN O ((3)P) + H SUB 2 O COLLISIONS
Bernard R. Johnson 15 Jan. 1986 24 p refs
(Contract F04701-85-C-0086)
(AD-A164159; TR-0086(6945-04)-2; SD-TR-85-85) Avail: NTIS HC A02/MF A01 CSCL 07/4

Cross sections for the vibrational excitation of H20 in collision with 0(3P) are calculated for relative collision energies of 0.5 to 3.0 eV by the vibrational close-coupling rotational infinite order sudden method using an accurate potential energy surface. The excitation cross sections obtained by this quantum mechanical calculation are compared to results of a recently published quasiclassical trajectory study which used the same potential surface. Very large differences between the quantum mechanical and classical trajectory results are found. GRA

N86-25233# California Univ., Berkeley. Lawrence Berkeley Lab.
SEARCH FOR RIGHT-HANDED CURRENTS BY MEANS OF MUON SPIN ROTATION Ph.D. Thesis
David PHilip Stoker Sep. 1985 141 p
(DE86-002870; LBL-20324) Avail: NTIS HC A07/MF A01

A muon spin rotation (mu SR) technique has been used to place limits on right-handed weak currents in mu(+) decay. A beam of almost 100% polarized surface muons obtained from the TRIUMF M13 beamline was stopped in essentially non-depolarizing > 99.99% pure metal foils. The mu(+) spins were precessed by 70-G or 110-G transverse fields. Decay e(+) emitted within 225 mrad of the beam direction and with momenta above 46 MeV/c were momentum-analyzed to 0.2%. Comparison of the mu SR signal amplitude with that expected for (V-A) decay yields an endpoint asymmetry xi P(sub mu)delta/rho > 0.9951 with 90% confidence. In the context of manifest left-right symmetric models with massless neutrinos the results imply the 90% confidence limits M(W sub 2) > 381 GeV/c(2) and 0.057 < zeta < 0.044, where W sub 2 is a predominantly right-handed gauge boson and zeta is the left-right mixing angle. Limits on M(W sub 2) for M(nu sub mu R) does not equal 0 are also presented. The endpoint asymmetry is used to deduce limits on the nu sub mu L mass and helicity in pi(+) decay, non-(V-A) couplings in helicity projection form, and the mass scale of composite leptons. M.G.

N86-25234# Massachusetts Univ., Amherst.
NUCLEAR STRUCTURE STUDIES BY THE SCATTERING OF MEDIUM-ENERGY ELECTRONS Progress Report, 1 Sep. 1984 - 31 Aug. 1985
G. A. Peterson and R. S. Hicks Sep. 1985 48 p
(Contract DE-AC02-76ER-02853)
(DE86-002265; DOE/ER-02853/24) Avail: NTIS HC A03/MF A01

The ratio of longitudinal to transverse scattering from various nuclei as part of the high energy program was begun. The electrodisintegration of the deutron, the search for discrete resonances in the continuum of He-4, high momentum transfer of elastic scattering from B-10,C-13, and N-14, and the transverse isoscalar excitation of Mg-24 were studied. Publications were listed and the status of the VAX computer was given. The computer peripherals were described which allow access to the Nuclear Physics computer. B.G.

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

N86-25235# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
NUMERICAL SOLUTIONS OF SELECTED PROBLEMS WHICH ARISE IN THE THEORY OF PARTICLE BEAMS M.S. Thesis
James A. Mobley Dec. 1985 106 p refs
(AD-A164041; AFIT/GAE/MA/85D-1) Avail: NTIS HC A06/MF A01 CSCL 20/7

A previous study led to the development of a closed form solution to the dynamic behavior of a charged particle beam. This solution was found for a simple, but nontrivial, single degree of freedom model (the electrostatic approximation model). This thesis investigates the characteristics of this closed form solution using three different types of inputs. The closed form solution is then verified by using finite difference to generate compatible results. Also investigated are the characteristics of the dynamic model prior to the implementation of the electrostatic approximation. GRA

N86-25236# Nuclear Regulatory Commission, Washington, D. C. Div. of Radiation Programs and Earth Sciences.
DISPOSAL OF HIGH-LEVEL RADIOACTIVE WASTES IN THE UNSATURATED ZONE: TECHNICAL CONSIDERATIONS AND RESPONSE TO COMMENTS Final Report
C. J. Hackbarth, T. J. Nicholson, and D. D. Evans Oct. 1985 47 p refs
(TI86-900170; NUREG-1046-F) Avail: NTIS HC A03/MF A01

On July 22, 1985, the U. S. Nuclear Regulatory Commission (NRC) promulgated amendments to 10 CFR Part 60 concerning disposal of high level radioactive waste (HLW) in geologic repositories in the unsaturated zone (50 FR 29641). The principal technical issues considered by the NRC staff during the development of these amendments was discussed. Certain technical discussions originally presented in draft NUREG-1046 were revised based on public comment letters and an increasing understanding of the physical, geochemical, and hydrological processes operative in unsaturated geologic media. The following issues related to disposal of HLW within the unsaturated zone were discussed: hydrogeologic properties and conditions, heat dissipation and temperature, geochemistry, retrievability, potential for exhumation of the radioactive waste by natural causes and by human intrusion, the effects of future climatic changes on the level of the regional water table, and transport of radionuclides in the gaseous state. On July 22, 1985, the U. S. Nuclear Regulatory Commission (NRC) promulgated amendments to 10 CFR meter depth for waste emplacement, limitations on exploratory boreholes, backfill requirements, waste package design criteria, and provisions for ventilation. Author

74 OPTICS

Includes light phenomena.

N86-25237# National Aeronautics and Space Administration, Washington, D.C.
OPTICAL STAR COUPLER WITH LARGE NUMBER OF INPUTS AND OUTPUTS
J. Saniter, F. Schmidt, and T. Hermes Mar. 1986 27 p refs Transl. into ENGLISH of W. German patent no. 3423221A1 (29 Nov. 1984) p 1-27 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(NASA-TM-88395; NAS 1.15:88395) Avail: NTIS HC A03/MF A01 CSCL 20F

Attenuation based on the power division is made linearly dependent on the maximum number of inputs and outputs, by cascading coupler elements. The coupler elements are connected together in such a way that only after the last cascade step does each outgoing line present the same composition of components of all incoming signals. Author

N86-25238# Naval Postgraduate School, Monterey, Calif.
INFRARED BACKGROUND AND TARGET MEASUREMENT HC A05/MF A01 M.S. Thesis
Alexander Manolopoulos Dec. 1985 98 p refs
(AD-A163567) Avail: NTIS HC A05/MF A01 CSCL 20/6

This thesis describes measurements of IR background radiance. To provide background radiance values for the development of the AN/SAR - 8 (IRSTD) system, the radiance of clouds and buildings was measured using the AGA Thermovision 780. The measurement values given in Isotherm Units (photon flux equivalent) were translated into radiance values (W/cc sr). The emissivity of the different objects was also computed for the 8-14 micrometers window assuming that their emissivity in the 3-5.6 micrometers band is close to that of a blackbody. The average radiance of clouds was found to be .0003302 W/cc sr in the 3-5.6 micrometers window and .003544 w/cc sr in the 8-14 micrometers window. The corresponding values for buildings were .0003587 W/cc sr and .004552 W/cc sr respectively. GRA

N86-25239# Naval Postgraduate School, Monterey, Calif.
REMOTE MEASUREMENT OF THE ATMOSPHERIC ISOPLANATIC ANGLE AND DETERMINATION OF REFRACTIVE TURBULENCE PROFILES BY DIRECT INVERSION OF THE SCINTILLATION AMPLITUDE COVARIANCE FUNCTION WITH TIKHONOV REGULARIZATION Ph.D. Thesis
Kurt B. Stevens Dec. 1985 169 p
(AD-A163629; NPS-61-86-008) Avail: NTIS HC A08/MF A01 CSCL 20/6

It is difficult to propagate a diffraction-limited laser beam through the atmosphere, since the atmosphere contains random index of refraction fluctuations. Two parameters that characterize the atmosphere for optical propagation are the atmospheric isoplanatic angle, theta sub 0, and the refractive turbulence structure parameter, (C sub n) squared. This thesis deals with improved methods for measuring theta sub 0 and (C sub n) squared profiles using optical techniques. By apodizing the receiver telescope aperture, one can improve the weighting function for isoplanatic angle measurement substantially over previous systems. The weighting function is not found significantly affected by inner scale changes with altitude and that the error in isoplanatic angle measurement from strong low altitude turbulence ($z < 1$ km) with this weighting function is small. Data collected with the improved isoplanometer shows temporal trends in the isoplanatic angle on the order of 90 seconds that have not been observed before. Direct inversion of the amplitude covariance function (including aperture averaging effects) to yield refractive turbulence profiles is known to be ill-posed. I suppress this condition using Tikhonov

regularization and reproduce refractive turbulence profiles from actual (C sub n) squared data with some success. GRA

N86-25240# Royal Signals and Radar Establishment, Malvern (England).
ROUTING OF HIGH DATA RATE SIGNALS USING DEGENERATE FOUR WAVE MIXING IN BSO
C. L. West and M. S. Hazell 1985 12 p refs
(AD-A163746; RSRE-MEMO-3891; DRIC-BR-98309) Avail: NTIS HC A02/MF A01 CSCL 20/6

Non-linear optical phase conjugation can be directly applied to real time spatial and/or temporal information processing of electromagnetic waves. In photorefractive materials the process may be described in terms of dynamic holography. The speed at which grating formation takes place is limited by the physical properties of the crystal and the intensities of the optical beams used to write the grating. The speed at which diffraction may occur from this grating does not, however, suffer such limitations and in this memorandum we demonstrate the use of degenerate four wave mixing in BSO to direct the flow of data whose information bandwidth exceeds 1MHz. GRA

N86-25241# Environmental Research Inst. of Michigan, Ann Arbor.
PARALLEL IMAGE TRANSMISSION THROUGH A SINGLE OPTICAL FIBER Final Report, 10 Jun. 1981 - 9 Nov. 1985
Anthony M. Tai Jan. 1986 62 p refs
(Contract DAAG29-81-K-0129)
(AD-A163809; ERIM-155700-18-F; ARO-18203.5-PH) Avail: NTIS HC A04/MF A01 CSCL 20/6

New approaches for the transmission of two-dimensional images through a single optical fiber are developed to take better advantages of the bandwidth and the relative immunity to interference offered by optical fibers. Approaches studied include phase-conjunction, matched filtering, axial-angle multiplexing, wavelength multiplexing and various combinations of the approaches. Possible system designs employing these approaches are presented and their merits are discussed. GRA

N86-25242# California Univ., Berkeley. Dept. of Physics.
FAR INFRARED HETERODYNE DETECTION WITH GALLIUM DOPED GERMANIUM PHOTOCONDUCTORS Final Report, 1 Apr. 1982 - 31 Mar. 1985
Charles H. Townes and Reinhard Genzel 26 Nov. 1985 10 p refs
(Contract DAAG29-82-K-0117)
(AD-A163879; ARO-19253.1-PH) Avail: NTIS HC A02/MF A01 CSCL 17/5

This contract has been directed at the examination of the bandwidth and sensitivity of semiconducting heterodyne detectors for far infrared radiation (FIR). Germanium detectors variously doped with gallium have been of prime interest. However, HeCdTe detectors have also been tested. While efforts to find good FIR heterodyne detectors have been slow, towards the end of the contract period substantial success was achieved and measurements have continued even past the contract period to round out what we regard as important quantitative measurements of improved detection. We have measured faster, more responsive detectors and have reduced our system temperature. We have also seen for the first time a change in detector bandwidth with bias voltage. We believe we have proceeded in the correct direction in detector fabrication and doping levels to produce faster detectors while retaining high responsivity. GRA

N86-25243 Department of the Air Force, Washington, D.C.
HIGH EFFICIENCY PULSE ULTRAVIOLET LIGHT SOURCE Patent
James P. OLoughton, inventor (to Air Force) Issued 20 Mar. 1986 5 p
(AD-D011965; US-Patent-4,550,275; US-Patent-Appl-SN-539889; US-Patent Class-315-241) Avail: US Patent and Trademark Office CSCL 13/1

A high efficiency pulsed ultraviolet light source is described. Which comprises a flashlamp containing a noble gas, for example xenon, at low pressure, and having a pair of electrodes between a discharge through the gas may be impressed, and an electrical pulse forming circuit connected to the flashlamp comprising a lamp resistance and high voltage source connected in series with the lamp, and a capacitor and switch connected in parallel to the lamp, the capacitor and resistance selected to minimize the total inductance of the circuit and to maximize the voltage stress on the gas contained within the lamp. GRA

N86-25244# Naval Postgraduate School, Monterey, Calif.
DETECTION AND EXPLOITATION OF VIBRATION INDUCED OPTICAL AMPLITUDE MODULATION M.S. Thesis
George R. Scott Dec. 1985 77 p refs
(AD-A164179) Avail: NTIS HC A05/MF A01 CSCL 17/8

The remote sensing of surface vibrations on an object via optical methods has many applications. Current techniques use phase coherent methods which are difficult to apply against a noncooperative target, or one at great distances. A simple method of exploiting the apparent amplitude modulation imposed on a light beam reflecting from a vibrating surface is explored. This method requires no phase reference between source and detector, and can use reflected sunlight as its sensor beam. The design and construction of an experimental receiver is presented, and its sensitivity against targets of varying reflectivity, specularity, and mechanical compliance is tested. Impact detection at a distance using this technique is demonstrated, as is identification of the impacted object from its recovered acoustic spectrum. Theoretical range curves are developed, and suggestions for additional uses of the technology are discussed. GRA

N86-25245# Maryland Univ., College Park. Center for Automation Research.
CONTINUOUS REPRESENTATIONS OF DIGITAL IMAGES
Chung-Nim Lee and Azriel Rosenfeld Oct. 1985 35 p refs
(Contract F49620-85-K-0009)
(AD-A164189; CAR-TR-158; CS-TR-1569; AFOSR-85-1218TR) Avail: NTIS HC A03/MF A01 CSCL 20/6

A 2D digital image S is represented conventionally by the union of grid squares containing pixels of S which we denote by F(S). This gives the correct topology for S with 8-adjacency, and with a little imagination, 4-adjacency can also be properly handled. However, one encounters difficulty in extending basic 2D results to 3D digital images. The last few years have seen the need for better methods which give a closer link with well developed continuous topology, especially with the advent of digital surface theory. We define a new continuous model F(S) by refining F(S). We show that this gives a better bridge between the two subjects, digital and continuous topologies. We also show how this space F(S) is related to two other continuous models. Although we concentrate only on 2D images in this paper, the concepts and general ideas extend to 3D images. A 3D version of this paper is in preparation. GRA

N86-25246# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
PSEUDO-COLOR DISPLAY OF LASER RADAR IMAGERY M.S. Thesis
Norman Barsalou 2 Dec. 1985 203 p refs
(AD-A164213; AFIT/GE/ENG/85D-3) Avail: NTIS HC A10/MF A01 CSCL 14/5

A pseudocolor representation of Carbon Dioxide 2 laser radar data is developed. The pseudo color scheme is based on the dilution of a set of baseline hues by white. The synthetic generation of laser radar scenes is used for display creation, and the results of analysis on synthetic scenes is applied to data collected by a CO2 pulsed radar system. GRA

N86-25247# Naval Postgraduate School, Monterey, Calif.
ANALYSIS OF CONTRAST SENSITIVITY AND SPECTRAL RESPONSE OF IMAGING SYSTEMS M.S. Thesis
Young Soo Kim Dec. 1985 47 p refs
(AD-A164228) Avail: NTIS HC A03/MF A01 CSCL 09/1

The characteristics of imaging systems CID, CCD, and VID-

ICON were investigated in terms of the contrast sensitivity and the spectral response in the near infrared region. The object distance of 83.5 cm, the radiant flux density of 0.93 microwatts/sq cm and a black and white bar chart were used for the measurement of CTF. The spectral response was measured at 2520 K using a tungsten light source. The CID image sensor has high sensitivity, resolving capability and spectral response at low light level comparing to the CCD or VIDICON. The limited resolution values of 23.0 line-pairs/mm for CCD and 28.4 line-pairs/mm for VIDICON, the cutoff wavelengths of 1.0 micrometers for CCD and 0.94 micrometers for VIDICON were determined. The limiting resolution value and the cutoff wavelength for CID were much higher than those of CCD or VIDICON and lay outside the range of this experiment. GRA

N86-25248# Los Alamos National Lab., N. Mex.
SHUTTERING EFFICIENCIES OF NANOSECOND-GATED PHOTOEMISSIVE SHUTTER TUBES
George J. Yates, Steven A. Jaramillo, Thomas S. Pagano (Edgerton, Germeshausen and Grier, Inc., Albuquerque, N. Mex.), and J. Paul Black (Edgerton, Germeshausen and Grier, Inc., Albuquerque, N. Mex.) 1985 9 p refs Presented at 1985 SPIE, San Diego, Calif., 19-23 Aug. 1985
(DE85-015728; LA-UR-85-2743; CONF-850887-14) Avail: NTIS HC A02/MF A01

Recent studies show that effective shuttering of photoemissive tubes, such as Silicon-Intensified-Target Vidicons (SITVS) and Microchannel-plate Image Intensifier Tubes (MCPTs), can vary widely depending upon the extent of their opacity to an input flux of photons. Optical feedthrough signals from photon transmission through the photocathode to the target or phosphor ranging from 10 to the-4 to 10 to the-9 power (when compared with gated signals) were measured for a large sampling of commercially available units. Effective shutter ratios of 10 to the 5th to 10 to the 8th power measured for units operated in quiescently dark environments can be substantially reduced by optical feed-through. Furthermore, ineffective suppression of photoemission can cause further reductions in shutter ratio. Reductions are roughly correlated with the ratio of optical gate duration to light pulse duration. Experimentation with various thicknesses of aluminum depositions on MCPT phosphors and chromium layering on SITV silicon targets indicate substantial reductions (2x to 15x) in transmission with minimal increases in threshold voltages required for gain. These results, together with exploratory studies of external coating of output fiber optics with transmission filters spectrally matched to minimize fee dthrough to P-20 phosphors are reported. DOE

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N86-25249# Nagoya Univ. (Japan). Inst. of Plasma Physics.
ADVANCED ICRF ANTENNA DESIGN FOR R-TOKAMAK
E. Kako, R. Ando, M Ichimura, Y. Ogawa, T. Amano, and T. Watari Jan. 1986 46 p refs
(IPPJ-759) Avail: NTIS HC A03/MF A01

The advanced ICRF antennas designed for the R-TOKAMAK (a proposal in the Institute of Plasma Physics, Nagoya University) are described. They are a standard loop antenna and a panel heater antenna for fast wave heating, and a waveguide antenna for ion Bernstein wave heating. The standard loop antenna is made of Al-alloy and has a simple structure to install because of radioactivation by D-T neutrons. For high power heating, a new type antenna called Panel heater antenna is proposed. It has a wide radiation area and is able to select a parallel wave number k. The field pattern of the panel heater antenna is measured. The feasibility of the waveguide antenna is discussed for ion Bernstein wave heating. The radiation from the aperture of the double ridge waveguide is experimentally estimated with a load simulating the plasma. Author

N86-25250# Niigata Univ. (Japan). Dept. of Physics.
KINK STABILITY OF LONG ION LAYERS
Akio Ishida Jan. 1986 29 p refs Prepared in cooperation with Nagoya Univ., Japan
(IPPJ-758) Avail: NTIS HC A03/MF A01

By means of the two-fluid model, the kink stability of a long thin field-reversed ion layer immersed in a dense low-temperature background plasma is studied theoretically. The two-fluid variational quadratic form with assumption of rigid displacements in the radial direction yields a new kink stability condition that includes the effect of the non-zero real frequency of the modes, which is due to the inertia of the ion layer. This effect is essential to explain the numerical results of Harned. As the ratio of the density of the background plasma to that of the ion layer increases, this new kink stability condition reduces to the conventional condition. The physical mechanism for the kink instability is discussed by the analogy with the electrostatic two-stream instability. Author

N86-25251# Nagoya Univ. (Japan). Inst. of Plasma Physics.
TAIL ANISOTROPY INSTABILITY DURING PLASMA CURRENT RISE BY LOWER-HYBRID WAVES IN A TOKAMAK
Mitsuru Yamagiwa Jan. 1986 41 p refs
(IPPJ-756) Avail: NTIS HC A03/MF A01

Tail anisotropy instability during lower-hybrid current rise is investigated. Tail formation by lower hybrid waves is studied by using a Fokker-Planck equation combined with the return field and the RF associated terms. Quasi-linear relaxation of the electron tail distribution under the influence of the plasma waves excited due to the instability is examined. It is found that the instability condition is related to the strength of the parallel diffusion by lower hybrid waves and the ratio of the electron cyclotron frequency to the electron plasma frequency. The time scale between the instability spikes and the suppression of the instability by electron cyclotron heating are also discussed. Author

N86-25252# Nagoya Univ. (Japan). Inst. of Plasma Physics.
ACTIVE DIAGNOSTICS OF MAGNETICALLY CONFINED ALPHA PARTICLES BY PELLET INJECTION
M. Sasao, K. N. Sato, Y. Nakamura (Kyoto Univ.), and M. Wakatani (Kyoto Univ.) Jan. 1986 19 p refs
(IPPJ-757) Avail: NTIS HC A02/MF A01

Confined alpha-particle diagnostics by pellet injection is proposed. The alpha-particle density can be obtained from the number of decaying photons emitted from He(+*) (n or = 2) ions which are produced through the one-electron transfer reaction of an alpha-particle from the probing ion ablated from the pellent before it is fully ionized. The counting rate estimated with theoretical cross sections and the calculated pellet ablation rate is sufficient for observation under a bremmstrahlung background. The alpha-particle velocity distribution will be also obtained from the Doppler broadening of the spectral lines. Author

N86-25253# Nagoya Univ. (Japan). Inst. of Plasma Physics.
VOLUME PRODUCED H(-), D(-) ION SOURCE FOR PROTON ACCELERATOR AND THERMO-NUCLEAR FUSION RESEARCH BY SHEET PLASMA (1)
Joshin Uramoto Jan. 1986 31 p refs
(IPPJ-760) Avail: NTIS HC A03/MF A01

In order to apply a sheet plasma type of volume produced H(-), D(-) ion source to injection of proton accelerators and neutral beam injection of thermo-nuclear fusion researches, a large sheet plasma of width 20 to approx. 25 cm and length 30 cm is produced under a discharge current of 175 A, a H2 gas pressure of about 2.5 x 10 to the -3 power Torr and gas flow of (2.0 to approx. 2.5) Torr l/sec in a magnetic field of (60 to approx. 110) gauss. Thus, H(-) or D(-) ion current is extracted in a current density up to 19 mA/sq cm or 16 mA/sq cm which is uniform within 10% over a large area (above 250 sq cm) of the sheet plasma surface, and in an acceleration voltage up to 4.5 kV. Then, an electron current

accelerated with H(-) or D(-) ions is reduced negligibly beyond a distance of 2 cm from the final acceleration electrode. Author

N86-25254# Nagoya Univ. (Japan). Inst. of Plasma Physics.
EXCITATION ANISOTROPY IN LASER-INDUCED-FLUORESCENCE SPECTROSCOPY: BROAD-LINE EXCITATION CASE
A. Hirabayashi, Y. Nambu, and T. Fujimoto Jan. 1986 37 p refs
(IPPJ-761) Avail: NTIS HC A03/MF A01

Treatment of excitation anisotropy for Laser-Induced-Fluorescence Spectroscopy (LIFS) is extended to the intense excitation case. The depolarization coefficient is derived for intense excitation limit (linearly-polarized or unpolarized light excitation), and the result is presented in tables. For the region of intermediate intensity between the weak and intense excitation limits, the master equation is solved for specific example of transitions and its result is compared with experiment. Author

N86-25255# Nagoya Univ. (Japan). Inst. of Plasma Physics.
LECTURES ON TOPICS IN MAGNETIC RECONNECTION AND TRANSPORT IN FUSION DEVICES
Russell M. Kulsrud (Princeton Univ., N.J.) Jan. 1986 40 p
(IPPJ-762) Avail: NTIS HC A03/MF A01

Magnetic reconnection in the confinement of plasmas in fusion devices is discussed in relationship to the formation of magnetic islands in magnetostatic equilibrium for systems of imperfect symmetry; breakup of magnetic surfaces due to nonideal instabilities such as resistive modes or drift waves; and tearing modes which break up magnetic surfaces and form islands. Particle motions that lead to ripple transport in stellarators and other nonaxisymmetric geometries such as heliotrons and torsatrons are described. The physics of nonlinear ballooning modes are explained. B.G.

N86-25256# Nagoya Univ. (Japan). Institute of Plasma Physics.
THE INFLUENCE OF A HOT PARTICLE COMPONENT ON PLASMA STABILITY
Adel M. El-Nadi Dec. 1985 15 p refs
(IPPJ-755) Avail: NTIS HC A02/MF A01

A hot particle component introduced into a background plasma can significantly alter the properties of both the equilibrium and perturbed states. Various aspects of the problem are reviewed together with the underlying physics. Author

N86-25257# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
GRAPHICAL STUDY OF ELECTROMAGNETIC WAVE ACCESSIBILITY IN TOKAMAK PLASMAS NEAR THE ELECTRON-CYCLOTRON FREQUENCY
C. S. Shibata and A. Montes Feb. 1986 30 p refs Proposed for presentation at the 38th Annual Meeting of the SBPC, Curitiba, Brazil, 9-16 Jul. 1986
(INPE-3810-PRE/896) Avail: NTIS HC A03/MF A01

The accessibility of electron-cyclotron frequency range electromagnetic waves in magnetized inhomogeneous tokamak plasmas is studied using the cold plasmas model. Simple equations for cutoff and resonance surfaces are obtained for parabolic density profile plasma. Using cartesian coordinates in the poloidal cross section of the tokamak, these equations are arranged in a convenient standard form, in order to facilitate the plotting of the various surfaces simultaneously. Graphical outputs for several cases are presented, together with the principal cutoff and resonance frequency profiles along the minor radius. Author

N86-25258# Nagoya Univ. (Japan). Inst. of Plasma Physics.
PROCEEDINGS OF TOPICAL MEETING ON PARTICLE BEAM FUSION AND ITS RELATED PROBLEMS, VOLUME 1
Keishiro Niu, ed. Mar. 1986 260 p refs Meeting held in Nagoya, Japan, 31 Oct. - 2 Nov. 1985
(IPPJ-769-Vol-1) Avail: NTIS HC A12/MF A01

The following topics in the field of pulsed power techniques and particle beam fusion were discussed: ion beam propagation, calculation methods for target implosions, X-ray driven inertial fusion confinement, high density plasmas, power plants, ion trapping, plasma production, heavy ion acceleration, and linear accelerators. B.G.

N86-25259# Nagoya Univ. (Japan). Inst. of Plasma Physics.
THERMAL BARRIER POTENTIAL OF A TANDEM MIRROR
I. Katanuma, Y. Kiwamoto, K. Ishii, and S. Miyoshi Mar. 1986 46 p refs
(IPPJ-768) Avail: NTIS HC A03/MF A01

The relation between the electrostatic potential and the low energy electron density under electron cyclotron resonance heating (ECRH) in the thermal barrier of a tandem mirror is investigated analytically and numerically. The distribution function of mirror trapped electrons at low energy is found to stretch out in the perpendicular direction to the magetic field and to be well approximated by bi-Maxwellian rather than by Maxwellian equations. The Boltzman law for barrier depth is modified to include central cell electron temperature. A bounce averaged Fokker-Planck simulation of the thermal barrier potential was performed and a scaling of the barrier potential depth against the low energy electron density in the barier was obtained. A comparison was made betwen the model obtained and the experimental results of GAMMA 10. B.G.

N86-25260# Nagoya Univ. (Japan). Inst. of Plasma Physics.
A SOLIDARY WAVE OF A RELATIVISTIC MAGNETOSONIC WAVE PROPAGATING PERPENDICULARLY TO A MAGNETIC FIELD
Yukiharu Ohsawa Mar. 1986 24 p refs
(IPPJ-767) Avail: NTIS HC A02/MF A01

A relativistic theory for a nonlinear magnetosonic wave propagating perpendicularly to a magnetic field is developed. On the basis of a relativistic two fluid cold plasma model, the structure of a stationary magnetosonic wave is studied. Relativistic effects become important for the parameter regime omega sub ce/omega sub pe is approximate or greater than 1, because the fluid electron velocity perpendicular to a magnetic field and parallel to the wave front takes values close to the speed of light for such plasma parameters. It is found that there exists a stationary solitary wave solution even in the relativistic model. Some properties of the solitary wave, such as the soliton width, are discussed. Author

N86-25261# Nagoya Univ. (Japan). Inst. of Plasma Physics.
MEASUREMENT OF DENSITY FLUCTUATIONS ON THE JIPP T-II TOKAMAK PLASMA BY MILLIMETER AND SUB-MILLIMETER WAVE SCATTERING
Tsutomu Tetsuka Feb. 1986 140 p refs
(IPPJ-766) Avail: NTIS HC A07/MF A01

Scattering experiments with a 2 mm microwave oscillator and a 337 micron HCN laser were performed to measure density fluctuations on the JIPP T-II/T-IIU tokamak in a wide variety of the plasma density. An instability and an externally excited wave was observed during radio frequency heating. From the measurements of the frequency and wave number spectra of the instability, the density fluctation shows characteristics of a turbulence which is originated in the instability of drift type. The dependence of the fluctuation level on the plasma parameters was investigated and compared with the scaling law of the energy confinement time of the plasma. The relationship between the density fluctuation level and the confinement time was obtained. The fluctuation level decreases as the electron density is increased. The plasma temperature dependence of the density fluctuation was also investigated. The excited wave during the ion-cyclotrom range of frequency heating experiment was studied by the HCN laser scattering. The influence of magnetohydrodynamic activity on the mode converted ion Berstein wave was examined. Author

N86-25262# Naval Research Lab., Washington, D. C.
LASER INTERACTION IN LONG-SCALELENGTH PLASMAS Interim Report
J. H. Gardner, F. C. Herbst, M. J. Young, J. A. Stamper, and S. P. Obenschain 31 Dec. 1985 65 p

(AD-A163604; NRL-MR-5651) Avail: NTIS HC A04/MF A01 CSCL 20/9

Absorption of a short-pulse, high-intensity Nd-laser beam (vacuum irradiance of 10 to the 14th power to 10 to the 15th power W/sq cm) by preformed plasmas of different density scalelengths is investigated. Increased effects of plasma instabilities are found at longer scalelengths. The amount of backscattered light increases with plasma scalelength and limits the absorption fraction at the longest scalelength. The onset of suprathermal electron production, deduced from observations of energetic (20 to 50 keV) X-rays, occurs at lower laser irrradiance for longer scalelength plasmas. A correlation between energetic X-rays and 3 omega sub 0/2 emission suggests that the suprathermal electrons are produced by a plasma instability at quarter-critical density. At higher intensities there is evidence for severe perturbations of the preformed plasma and for self-focusing of the incident beam. GRA

N86-25263# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.

ENERGY CONFINEMENT STUDIES OF LOWER HYBRID CURRENT DRIVEN DISCHARGES IN THE ALCATOR C TOKAMAK

S. Knowlton, P. Bonoli, C. Fiore, S. McCool, S. McDermott, M. Porkolab, Y. Takase, and S. Texter Jun. 1985 10 p Presented at the 6th Topical Conference on Radio Frequency Plasma Heating, Pine Mountain, Ga., 13 May 1985

(Contract DE-AC02-78ET-51013)

(DE85-014754; DOE/ET-51013/153; PFC/CP-85-4; CONF-8505130-9) Avail: NTIS HC A02/MF A01

The energy confinement properties of purely rf-driven plasmas on Alcator C are being investigated by experimental measurements of the bulk electron and ion temperature profiles, and by numerical modelling of the lower hybrid wave propagation and thermal energy transport. Power balance studies are performed on plasmas with parameters n bar(sub e) = 3 - 7 x 10 to the 13th power/cu cm, B = 7 - 11 T, I(sub p) = 100 - 200 KA, and q (a) greater than or equal to 8, and with rf powers up to 1 MW at 4.6 GHz. The temperature measurements from rf-driven discharges are compared with those from similar ohmic discharges (identical current and density). The gross energy confinement time is lower in the rf-driven discharges than in the ohmic ones by a factor of 1.5 to 4, depending on the plasma conditions and rf power. While tau (sub E) in ohmic discharges increases with density and is independent of the toroidal field, the confinement time in the rf-driven discharges decreases with rf power, is independent of density in the range n bar(sub e) = 3 - 7 x 10 to the 13th power/cu cm, and increases with the toroidal magnetic field. The confinement degrades slightly with increasing current in both rf-driven and ohmic discharges. The code used to simulate these results employs a lower hybrid ray tracin g package, a Koffer-Planck code for the evolution of the fast electron tail, and enhanced thermal transport models for auxiliary-heated plasmas. DOE

N86-25264# SRI International Corp., Menlo Park, Calif.

STUDIES OF AUTOIONIZING STATES RELEVANT TO DIELECTRONIC RECOMBINATION

T. F. Gallagher 11 Oct. 1985 41 p refs

(Contract DE-AT03-79ER-10376)

(DE86-002908; DOE/ER-10376/T6) Avail: NTIS HC A03/MF A01

Dielectronic recombination, the inverse of autoionization, is a process leading to significant power loss in CTR plasmas. Although it is known that dielectronic recombination proceeds via autoionization Rydberg states, few data exist on autoionizing states and how they are affected by conditions found in a CTR plasma. Under this research program we have been using a novel laser excitation technique developed at SRI to study autoionizing states and the perturbing effects of electric fields found in CTR plasmas. We describe experimental investigations of the spectroscopy of autoionizing Rydberg states, the energy analysis of electrons ejected from autoionizing states, autoionizing in electric fields, and the autoionization induced by an electric field. DOE

N86-25265 Texas Univ., Austin.

THEORETICAL STUDIES OF MAGNETIZED PLASMA TURBULENCE: ION-CYCLOTRON TURBULENCE, AND SHEAR FLOW TURBULENCE AND ITS APPLICATIONS TO TOKAMAK EDGE PHENOMENA Ph.D. Thesis

Tzihong Chiueh 1985 275 p

Avail: Univ. Microfilms Order No. DA8529831

Analytical theories of current driven ion cyclotron turbulence, treating incoherent phase space density granulations (clumps), and strongly magnetized electrostatic MHD turbulence are studied. For the former, the local structure as well as global effects (instability and anomalous transport) of clumps are examined. For the latter, two shear flow driven systems in the limit of vanishing magnetic shear, thus strictly two dimensional flows are also examined. Subsequently, the analysis is extended to a shear flow with finite magnetic shear, in an attempt to explain the turbulence characteristics observed in the tokamak edge. For ion-cyclotron turbulence, a weak collective dissipation regime, where waves and clumps coexist is studied. For two dimensional flows, mixing-layer and wake (or jet) turbulence is also studied. That the mixing layer expands linearly in time, is predicted using a quasi-linear model. This theory is applied to tokamak edge turbulence, where dc electric field induced poloidal flow exists. Dissert. Abstr.

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N86-25266 United Kingdom Atomic Energy Authority, Harwell (England). Materials Development Div.

CRYSTALLOGRAPHIC TEXTURE: EXPERIMENTAL GEOMETRY AND DEFOCUSSING CORRECTION

B. E. Sheldon Aug. 1984 34 p refs

(AERE-R-11723) Avail: Issuing Activity

X-ray measurements of crystallite orientation distributions (crystallographic texture) have been performed at Harwell since 1975, and the results obtained have been invoked in attempts to describe the anisotropic behavior of bulk materials. Most of the data have been produced for zirconium alloys wherein the hexagonal-close-packed (h.c.p.) lattice imposes constraints upon polycrystalline aggregates which lead to their anisotropy. The details of the technique used at Harwell have not been well publicized, hence this paper attempts to identify the salient parameters and compare them with those used by other workers. Although the method is basically sound, certain areas of doubt have been identified and recommendations made as to their resolution. Author

N86-25267*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

COMPENSATION IN EPITAXIAL CUBIC SiC FILMS

B. Segall (Case Western Univ., Cleveland, Ohio), S. A. Alterovitz, E. J. Haugland, and L. G. Matus Mar. 1986 12 p refs

(NASA-TM-87269; E-2918; NAS 1.15:87269) Avail: NTIS HC A02/MF A01 CSCL 20L

Hall measurements on four n-type cubic SiC films epitaxially grown by chemical vapor deposition on SiC substrates are reported. The temperature dependent carrier concentrations indicate that the samples are highly compensated. Donor ionization energies, E sub D, are less than one half the values previously reported. The values for E sub D and the donor concentration N sub D, combined with results for small bulk platelets with nitrogen donors, suggest the relation E sub D (N sub D) = E sub D(O) - alpha N sub N sup 1/3 for cubic SiC. A curve fit gives alpha is approx 2.6x10/5 meV cm and E sub D (O) approx 48 meV, which is the generally accepted value of E sub D(O) for nitrogen donors in cubic SiC. E.A.K.

N86-25268*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
AUGER ELECTRON SPECTROSCOPY, SECONDARY ION MASS SPECTROSCOPY AND OPTICAL CHARACTERIZATION OF a-C-H AND BN FILMS
John J. Pouch, Samuel A. Alterovitz, and Joseph D. Warner 1986 13 p refs Presented at Symposium on Plasma Processing at the Spring Meeting of the Materials Research Society, Palo Alto, Calif., 15-18 Apr. 1986
(NASA-TM-87258; E-2950; NAS 1.15:87258) Avail: NTIS HC A02/MF A01 CSCL 20L

The amorphous dielectrics a-C:H and BN were deposited on III-V semiconductors. Optical band gaps as high as 3 eV were measured for a-C:H generated by C4H10 plasmas; a comparison was made with bad gaps obtained from films prepared by CH4 glow discharges. The ion beam deposited BN films exhibited amorphous behavior with band gaps on the order of 5 eV. Film compositions were studied by Auger electron spectroscopy (AES), X-ray photoelectron spectroscopy (XPS) and secondary ion mass spectrometry (SIMS). The optical properties were characterized by ellipsometry, UV/VIS absorption, and IR reflection and transmission. Etching rates of a-C:H subjected to O2 dicharges were determined. Author

N86-25269*# National Aeronautics and Space Administration. Pasadena Office, Calif.
METHOD OF MEASURING FIELD FUNNELING AND RANGE STRAGGLING IN SEMICONDUCTOR CHARGE-COLLECTING JUNCTIONS Patent Application
John A. Zoutendyk, inventor (to NASA) Filed 27 Nov. 1985 19 p
(Contract NAS7-918)
(NASA-Case-NPO-16584-1-CU; NAS 1.71:NPO-16584-1-CU; US-Patent-Appl-SN-802769) Avail: NTIS HC A02/MF A01 CSCL 20L

Electric-field funneling length is measured while irradiating a semiconductor charge-collecting junction with electron-hole-pair generating charged particles at a first junction bias voltage. The bias voltage is then reduced to a second level in order to reduce the depth of the depletion region such that the total charge can no longer be collected by drift and measured in the energy band previously displayed in the multichannel analyzer. This is representative of the maximum electric field funneling length which may be calculated by measuring the difference at the second bias voltage level of the depletion width and the ion penetration range. The bias voltage is further lowered to a third level at which the particles are collected over a spread of energy levels while at least some of the particles are still collected at the selected energy level. From this the different depths of penetration of the particles are determined while additional effects due to diffusion are minimized. NASA

N86-25270# Minnesota Univ., Minneapolis. Dept. of Chemical Engineering and Materials Sci.
OVERLAYER-INDUCED ENHANCED OXIDATION OF GaAs SURFACES Interim Report
S. Chang, A. Rizzi, C. Caprile, P. Philip, and A. Wall 31 Dec. 1985 26 p refs
(Contract N00014-84-K-0545)
(AD-A163450; AD-E401440; IR-5) Avail: NTIS HC A03/MF A01 CSCL 20/12

Thin metal overlayers deposited on GaAs (110) cleavage surfaces enhance the surface oxidation rate several orders of magnitude above the clean surface value. The magnitude of this effect depends on the chemistry of the overlayer, on the local morphology of the overlayer-semiconductor interface region and on the nature of the gaseous reactants. We present a synchrotron radiation photoemission investigation of the GaAs surface interaction with oxygen in the presence of Ag, Au and Cr overlayers, and of the GaAs-H2O reaction in the presence of Cr overlayers. We find that the promotion effect is maximum in the presence of Cr overlayers, and that the nature of the surface reaction products changes if oxygen or water is employed. In particular, in the case of oxygen, Ga and As-oxide phases are found with high atomic oxidation states present. If water is employed, only Ga oxide/hydroxyl phases are found at the surface, on top of a Cr-As subsurface layer that remains largely unaffected by oxidation.GRA

N86-25271# Duke Univ., Durham, N. C. Dept. of Chemistry.
ISOLATION AND CHARACTERIZATION OF AN ORGANOGALLIUM-ARSENIC CLUSTER: CRYSTAL STRUCTURE OF ((PhAsH)(R2Ga)(PhAs)6(RGa)4)(R=Me3SiCH2)
Richard L. Wells, Andrew P. Purdy, Andrew T. McPhail, and Colin G. Pitt 10 Jan. 1986 11 p refs
(Contract N00014-83-K-0572)
(AD-A163485; DU/DC/TR-01) Avail: NTIS HC A02/MF A01 CSCL 20/2

(PhAsH)(R2Ga)(PhAs)6(RGa)4 (R = Me3SiCH2) has been isolated as a product of the reaction of PhAsH2 with (Me3SiCH2)3Ga and determined by X-ray crystallographic analysis to be a cluster containing an As7Ga5 core. As part of our studies of synthetic methods and the identification of substituents which will permit the isolation of monomeric and oligomeric gallium-arsenic compounds, we investigated the reaction of PhAsH2 with (Me3SiCH2)3Ga. Primarily, it was of interest to ascertain if steric bulk would permit the isolation of compounds of the type (PhAsGaCH2SiMe3)n(n=1-4) and suppress formation of polymers similar to the nonvolatile polymeric material reported to be the primary product of the reaction of PhAsH2 with Me3Ga. GRA

N86-25272# Brown Univ., Providence, R. I. Dept. of Chemistry.
PREPARATION AND CHARACTERIZATION OF ZnSiP2 AND ZnGeP2 SINGLE CRYSTALS Annual Report, Mar. 1985 - Feb. 1986
G-Q. Yao, H-S. Shen, R. Kershaw, K. Dwight, and Aaron Wold 24 Jan. 1986 4 p refs
(Contract N00014-85-K-0177)
(AD-A163537) Avail: NTIS HC A02/MF A01 CSCL 20/2

Single crystals of ZnSiP2 and ZnGeP2 have been grown by several techniques and their electronic and optical properties were compared. It was found that Fe(III) could not be substituted for equal amounts of Zn (II) and Ge (IV) in the II-IV-V2 chalcopyrites. However, 0.5 atomic percent of Mn(II) was successfully substituted in the structure for Zn(II). GRA

N86-25273# Brown Univ., Providence, R. I. Dept. of Chemistry.
PREPARATION AND CHARACTERIZATION OF ZnSiP2 AND ZnGeP2 SINGLE CRYSTALS Technical Report, Mar. 1985 - Jan. 1986
Guang-Qing Yao, He-Sheng Shen, Robert Kershaw, Kirby Dwight, and Aaron Wold 27 Jan. 1986 12 p refs
(Contract N00014-85-K-0177)
(AD-A163559; TR-1) Avail: NTIS HC A02/MF A01 CSCL 20/2

Single crystals of ZnSiP2 and ZnGeP2 have been grown by several techniques and their electronic and optical properties were compared. It was found that Fe(III) could not be substituted for equal amounts of Zn(III) and Ge(IV) in the II-IV-V2 chalcopyrites. However, 0.5 atomic percent of Mn(II) was successfully substituted in the structure for Zn(II). GRA

N86-25274# IBM Research Lab., San Jose, Calif.
PROPERTIES OF ORGANIC SUPERCONDUCTORS Final Report, Sep. 1982 - Sep. 1983
R. L. Green and E. M. Engler Sep. 1983 23 p refs
(Contract N00014-80-C-0792)
(AD-A163573) Avail: NTIS HC A02/MF A01 CSCL 20/3

The major results were: 1. Discovery of a new class of organic superconductors based on the (BEDT-TTF) molecule. This discovery has proven to be very important since recent chemical modification of our (BEDT-TTF) compound has led to a superconducting transition temperature of 8K, quite high for an organic solid. This offers the possibility that superconductivity can be found at temperatures greater than inorganic materials. The characterization of the (BEDT-TTF)2X superconductors included transport, magnetic and structural properties and these are discussed in the reference. 2. Measurement of the far IR properties of (TMTSF)2

C1O4. These results proved that a large superconductivity gap does not exist in (TMTSF)2 C1O4, contrary to previous speculations and erroneous interpretation of data by other workers. This rules out the possibility of superconducting fluctuations in the (TMTSF)2X class of organic superconductors. 3. Observation of now features of the magnetic-field-induced transition in (TMTSF)2 C1O4. The field-induced-transition (FIT) is quite anomalous and appears to be unique in solid state physics. The Hall effect and the magneto-resistance of (TMTSF)2 C1O4 was measured as a function of magnetic field up to 20T. GRA

N86-25275# Aerojet Electrosystems Co., Azusa, Calif.
SCHOTTKY BARRIER SURFACE SCIENCE Final Report
Patricia M. George Jul. 1985 31 p refs
(Contract N00014-83-C-0680)
(AD-A163574; AESC-7855) Avail: NTIS HC A03/MF A01 CSCL 07/4

Thermal desorption mass spectrometry (TDMS) and X-ray photoelectron spectroscopy (XPS) are utilized to study GaAs(100) surfaces prepared by MBE and chemical etching. XPS results on the chemically etched GaAs samples revealed As present in GaAs and As(+3) in the form of As2O3. TDMS of both the chemically etched and MBE prepared GaAs showed several impurities such as H2, H2O, CO2 and CO. Also, the surface reactions of water and ammonia with atomically clean GaAs survaces are studied with XPS and TDMS. These results help identify possible contaminants that may interfere with GaAs device performance. GRA

N86-25276# Brown Univ., Providence, R. I.
THE PHOTOELECTROCHEMICAL PROPERTIES OF MoS SUB2 SINGLE CRYSTALS GROWN IN THE PRESENCE OF COBALT
D. M. DAmbra, J. Kershaw, R. Baglio, K. Dwight, and Aaron Wold 29 Jan. 1986 17 p refs
(Contract N00014-77-C-0387)
(AD-A163592; TR-39) Avail: NTIS HC A02/MF A01 CSCL 20/2

Molybdenum Disulfide single crystals have been grown in the presence of cobalt. Photoresponse has been measured and compared with that from undoped MoS2. The results are consistent with the segregation of cobalt on the surface edges of the doped crystals. GRA

N86-25277# California Univ., Los Angeles. School of Engineering and Applied Science.
THEORETICAL INVESTIGATION OF POINT DEFECTS OF MERCURY CADMIUM TELLURIDE A01 Final Report, 20 Mar. 1981 - 19 Sep. 1985
Dee-Son Pan 1 Nov. 1985 180 p refs
(Contract DAAG29-81-K-0054)
(AD-A163735; ARO-17684.3-EL) Avail: NTIS HC A09/MF A01 CSCL 20/2

We have investigated a number of electronic properties related to point defects in the Hg(1-x)Cdx Te alloy system. A detailed calculation for the electronic starter for mercury vacancies was carried out and we found those mercury vacancies are shallow double acceptors. Both the first and second ionization energies are calculated for the whole range of alloy composition. The theoretical results are consistent with current experimental data. But more conclusive and accurate data are required. We have investigated other native point defects as well. Interesting qualitative conclusions were reached. We have looked into the substitutional disorder in Hg(1-x)CdxTe alloy system. An empirical pseudopotential theory for alloy fluctuation potential in this case was proposed. We have applied the theory to study the band gap bowing, and level broadening of shallow donors and acceptor, as well as bound excitons. The theoretical results agree well with the only available data from bound exciton broadening and from band gap bowing in Hg(1-x)Cdx Te. Nonparabolic effects in a narrow band gap Hg(1-x)Cdx Te were also investigated. Interesting results on energy level of shallow donors and transport properties are reported. GRA

N86-25278# Westinghouse Research and Development Center, Pittsburgh, Pa.
THIN FILM TECHNOLOGY OF HIGH-CRITICAL-TEMPERATURE SUPERCONDUCTING ELECTRONICS Final Report, 1 Aug. 1982 - 30 Sep. 1985
J. Talvacchio, A. I. Braginski, J. R. Gavaler, and M. A. Janocko 11 Dec. 1985 159 p
(Contract N00014-82-C-0617)
(AD-A136053; Rept-85-909-TUDEV-R1) Avail: NTIS HC A08/MF A01 CSCL 09/5

The objective of this three-year program was to develop a technology of Josephson tunnel junctions capable of operating at temperatures above 10K. The superconducting electrode materials investigation were V3Si, Nb3Sn and Mo-Re. Tunnel barriers were formed mostly by oxidizing metallic overlayers of Al and Y. Superconductor/barrier interfaces were characterized by surface-analytical techniques. The results of characterization permitted fabrication of junction with Nb3Sn and Mo-Re base electrodes and Pb, Pb-Bi and Mo-Re counterelectrodes having nearly ideal current-voltage characteristics. These counterelectrodes were deposited at temperatures not exceeding T = 100 C. The Mo-Re counterelectrode formed at low T had a critical temperature, Tc, of only 8K. A high-critical-temperature Nb3Sn counterelectrode requiring high deposition temperatures could not be fabricated successfully. The main cause of this negative result was the nonuniform coverage of the base with overlays which contained thin or defective spots. In contrast to Nb3Sn high-Tc-NbN counterelectrodes were successfully fabricated and sumgap voltages exceeding 5 mV were measured at 4.2K. The report contains new information on artificial barriers and on Mo-Re and Nb3Sn superconducting films. GRA

N86-25279# Florida Univ., Gainesville.
A CHARACTERIZATION OF THE CHEMICAL VAPOR DEPOSITION OF GALLIUM ARSENIDE AND INDIUM PHOSPHIDE IN THE HYDRIDE AND CHLORIDE SYSTEMS Interim Report, Jan. 1982 - Dec. 1984
D. J. Meyer and T. J. Anderson Dec. 1985 215 p refs
(Contract F19628-82-K-0008)
(AD-A164259; RADC-TR-85-224) Avail: NTIS HC A10/MF A01 CSCL 20/12

The fundamental chemistry surrounding the chemical vapor deposition of GaAs and InP in the hydride and chloride processes was investigated. Chemical equilibrium calculations showed that ICl, V4 and V2 were the dominant group III and V species in the vapor phase. These calculations also demonstrated that vapor phase silicon species, formed by the interaction of H2 and HCl with the reactor wall, may be present at compositions up to 1 ppm under typical operation conditions. It was shown that the formation of vapor phase silicon species can be suppressed by the addition of small amounts of H20 or by replacing the H2 carrier gas with an inert gas. The unintentional incorporation of silicon into III-V epitaxial layers may be decreased by reducing the amount of silicon species in the vapor phase or by shifting these silicon species from hydrogen rich to chlorine rich species through the addition of HCl or VCl3. The use of solid and liquid group III sources in the chloride process was compared. In the GaAs system, the liquid source yielded a much greater degree of supersaturation than did the solid source. This difference was much less pronounced for the InP system. The equilibrium chemistry of the hydride process was found to behave similarly to that of the chloride process. The degree of supersaturation present in the hydride process was found to be lower than that in the chloride process. The thermal decompositions of NH3, PH3, and Ash3 were studied in a constant volume reactor using a mass spectrometer. GRA

N86-25280# United Kingdom Atomic Energy Authority, Harwell (England). Materials Development Div.
IMPURITY DIFFUSION IN NIO GRAIN BOUNDARIES
A. Atkinson and R. I. Taylor Apr. 1985 30 p refs
(AERE-R-11763) Avail: Issuing Activity

The diffusion of Ce-139 and Cr-51 in polycrystalline NiO has

been studied in the temperature range 600-1100C in oxygen at a pressure of 1 atm. These impurities were chosen because of their different effective charges and segregation behavior and because of their relevance to the oxidation of metals at elevated temperature. The solubility of Ce in the NiO lattice is negligible, but Ce is soluble at NiO grain boundaries and dislocations. Consequently Ce tracer only diffused along these pathways and the resulting profiles were analyzed straightforwardly to give grain boundary and dislocation diffusion coefficients. The lattice solubility of Cr, on the other hand, is not negligible and Cr also segregates strongly to NiO grain boundaries. A procedure for analysing penetration profiles of such an impurity has been developed in which parameters describing segregation and grain boundary diffusion are deduced self-consistently. When combined with previous measurements of Ni and Co diffusion it is found that grain boundary coefficients decrease in the order Co, Ni, Cr, Ce as is also found for lattice diffusion (except for Ce, which has negligible lattice solubility). The implication of the results for the distribution of Cr and Ce in NiO films formed by metal oxidation is discussed. Author

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N86-25281 Whitcombe (David W.), Manhattan Beach, Calif.
THE BI-METRIC ABSOLUTE DIFFERENTIAL CALCULUS WITH APPLICATIONS TO GENERAL RELATIVITY
David W. Whitcombe 1986 112 p refs
Copyright. Avail: Issuing Activity

The Bi-Metric Absolute Differential Calculus (BMADC) is developed as an extension of the Levi-Civita/Ricci absolute differential calculus g sup-alpha beta. It includes both a reference metric g and a space curvature metric g sup-alpha beta. In the application to general relativity, the reference metric is chosen as the Galilean metric. The space curvature metric is obtained as a solution of the field equations. It is then shown that the difference in the Christoffel symbols formed with respect to these metrics is a tensor. It is conjectured that the field quantities may be identified with this tensor. It is felt that the electric, magnetic and quantum fields are similar in nature and origin to the gravitational field. Hence, there is no reason why the Einstein field equations should not also apply to these fields. Intuitive derivations are included to support these considerations. This analysis requires that the energy source tensor t sub mu upsilon be revised to include a radiation energy source term. The Hamiltonian formulation, introduced by Einstein, has been extended to include four new tensors. Author

N86-25282 British Library Lending Div., Boston Spa (England).
ENTHALPIES OF FORMATION OF LIQUID THREE-COMPONENT IRON-CERIUM-ALUMINIUM ALLOYS
M. S. Petrushevskii and G. M. Ryss 1986 7 p refs Transl. into ENGLISH from Izvestiya Vysshe Ucheb Zaved Chernaya Metallurgiya (USSR), no. 8, 1985 p 3-6
(BLL-M-36623-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The integral enthalpies of formation of iron-cerium-aluminum melts at 1870K in the entire composition range of the concentration triangle of this system are calculated on the basis of the microinhomogeneous structure of liquid alloys. Formulae for estimating the partial molar enthalpies of solution of components are given. Author

N86-25283# California Univ., Berkeley. Dept. of Physics.
SUPERCONDUCTING QUANTUM DEVICES, SUMMARY AND CONCLUSIONS
J. Clarke Aug. 1985 12 p Presented at the Third International Conference on Superconducting Quantum Devices, Berlin, West Germany, 25-28 Jun. 1985
(Contract DE-AC03-76SF-00096)
(DE86-001978; LBL-20059) Avail: NTIS HC A02/MF A01

Progress in the field of Squid detectors is reviewed. Topics discussed include: tunnel junctions, localized states in barriers, resonant tunneling, grain boundaries, nonlinear dynamics and chaos, macroscopic quantum tunneling, wave functions, nonequilibrium superconductivity, flux quantization, and the Aharonov-Bohm effect. B.G.

N86-25284*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THERMAL DESORPTION STUDY OF PHYSICAL FORCES AT THE PTFE SURFACE
D. R. Wheeler and S. V. Pepper 1986 15 p refs Presented at the International Conference on Surface and Colloid Chemistry, Potsdam, N.Y., 24-28 Jun. 1985; sponsored by American Chemical Society
(NASA-TM-87090; E-2680; NAS 1.15:87090) Avail: NTIS HC A02/MF A01 CSCL 20C

Thermal desorption spectroscopy (TDS) of the polytetrafluoroethylene (PTFE) surface was successfully employed to study the possibile role of physical forces in the enhancement of metal-PTFE adhesion by radiation. The thermal desorption spectra were analyzed without assumptions to yield the activation energy for desorption over a range of xenon coverage from less than 0.1 monolayer to more than 100 monolayers. For multilayer coverage, the desorption is zero-order with an activation energy equal to the sublimation energy of xenon. For submonolayer coverages, the order for desorption from the unirradiated PTFE surface is 0.73 and the activation energy for desorption is between 3.32 and 3.36 kcal/mol; less than the xenon sublimation energy. The effect of irradiation is to increase the activation energy for desorption to as high as 4 kcal/mol at low coverage. Author

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

No abstracts in this category.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N86-25285# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
AGARD BULLETIN: MEETINGS, PUBLICATIONS, MEMBERSHIP
Jan. 1986 77 p refs
(AGARD-Bull-86/1) Avail: NTIS HC A05/MF A01

Information on all planned 1986 AGARD meetings, including dates, locations and brief descriptions of their themes are contained. Also included is a list of all AGARD publications which were issued in 1985, together with their abstracts. B.G.

N86-25286# Cranfield Inst. of Tech., Bedford (England). Coll. of Aeronautics.
LEADERSHIP ON THE FLIGHT DECK: THE INFLUENCE OF CREW SOCIAL RELATIONS AND CREW MEMBER EXPERIENCE ON LEADERSHIP STYLE EFFECTIVENESS IN CIVIL AVIATION FLIGHT CREWS
John R. Harris and H. C. Muir Jan. 1986 30 p refs
(CAR-8612; ISBN-0-947767-37-1) Avail: NTIS HC A03/MF A01

Effective leadership is now recognized as a major influence of

flight crew performance. Following research on other work groups, this study examined the proposition that, rather than one leadership style being universally ideal, the effectiveness of a given style is determined by the group situation in which the leader finds himself. To this end, a survey of civil aviation captains was conducted, eliciting descriptions of incidents in which the respondent felt his leadership to be most effective. Details of leader-member social relations and crew member experience were included. In addition, leadership style of each respondent was assessed by the Least Preferred Co-worker (LPC) scale. (High LPC scores are theorized to indicate primary concern with establishing good working relations in the group. Low LPC scores indicate primary concern with orderly task completion). Author

N86-25287# Administrative Sciences Corp., Alexandria, Va.
A SURVEY OF O AND S (OPERATING AND SUPPORT) COST MODELS
16 Dec. 1985 53 p refs
(Contract N00014-85-C-0863)
(AD-A163438; ASC-R-147) Avail: NTIS HC A04/MF A01 CSCL 05/1

In Sep. 1985, a contract was awarded to develop procedures to estimate outyear operating and support (O&S) costs for new weapon system. The procedures to be developed were to differ from existing O and S cost models in sensitivity to design decisions and how design decisions impact O and S costs. As task I of this effort, contractors were to review existing methodologies for estimating operating and support costs of weapons systems. This report documents the team's efforts to date. Chapter 2 describes the approach used to review existing methodologies. It also summarizes findings. Chapters 3 and 4 discuss the methodologies reviewed. Chapter 3 addresses Navy models while Chapter 4 discussed the other services models. GRA

N86-25288# General Accounting Office, Washington, D. C. National Security and International Affairs Div.
NASA'S FIA (NATIONAL AERONAUTICS AND SPACE ADMINISTRATION'S FINANCIAL INTEGRITY ACT) PROGRAM: NASA'S PROGRESS IN IMPLEMENTING FINANCIAL INTEGRITY ACT REQUIREMENTS
Nov. 1985 54 p
(PB86-135100; GAO/NSIAD-86-3; B-216946) Avail: NTIS HC A04/MF A01 CSCL 05A

The National Aeronautics and Space Administration's (NASA's) continuing efforts to implement and comply with the Federal Manager's Financial Integrity Act (FIA) of 1982 (31 U.S.C. 3512 (b) and (c)) are reported. The review is part of a government wide assessment of 23 federal agencies. The GAO performed the reviews as part of their effort to enhance the federal government's ability to evaluate and improve internal controls and accounting systems. GRA

N86-25289# Coopers and Lybrand, Washington, D.C.
EVALUATING R AND D AND NEW PRODUCT DEVELOPMENT VENTURES: AN OVERVIEW OF ASSESSMENT METHODS $12.00/MF A01
Jan. 1986 56 p Prepared in cooperation with Commerce Dept., Washington, D.C.
(PB86-110806) Avail: NTIS HC $12.00/MF A01 CSCL 05A

Techniques to assess the business potential of technology projects are introduced. The intent is to familiarize decisionmakers with the range of available techniques. The principles involved are applicable to all those involved in the process of technological innovation: investors, financial intermediaries, individual entrepreneurs and other personnel who screen projects for possible commercial application. The assessment techniques include: checklist analyses, constraint analysis, environmental scoring model, profitability measures, sensitivity analysis, risk analysis, decision analysis and decision trees, and assessment of probabilities. GRA

N86-25290# National Planning Association, Washington, D. C.
TRENDS IN INDUSTRIAL R AND D ACTIVITIES IN THE UNITED STATES, EUROPE AND JAPAN, 1963-83
D. M. Levy and N. E. Terleckyj 26 Sep. 1985 53 p refs Presented at the Conference on Productivity Growth in Japan and The United States, Cambridge, Mass., 26-28 Aug. 1985
(Grant NSF SRS-83-07769)
(PB86-141371) Avail: NTIS HC A04/MF A01 Prepared in cooperation with George Mason Univ., Fairfax, Va. CSCL 05A

The growth in industrial R and D activity in the United States in relation to R and D expenditures in Western Europe and Japan is examined. The effects of foreign industrial R and D expenditures on private R and D expenditures in the United States are considered, with R and D expenditures performed under contract for the United States Government taken into account. A clear and positive relationship is shown between private R and D expenditures and R and D expenditures performed under government contract. In addition, the influence of foreign industrial R and D expenditures on U.S. expenditures is explored econometrically. GRA

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N86-25291*# Ecosystems International, Inc., Gambrills, Md.
A DEFINITION STUDY OF AN ADVANCED DATA COLLECTION AND LOCATION SYSTEM (ADCLS) Final Report
Jan. 1986 126 p refs
(Contract NAS5-28791)
(NASA-CR-177867; NAS 1.26:177867) Avail: NTIS HC A07/MF A01 CSCL 05B

The technical and economic advantages of developing an Advanced Data Collection and Location System (ADCLS) to operate within the Earth Observation System (EOS) planned for Polar Platform, as a replacement and/or augmentation of the existing ARGOS data collection system were assessed. The cost/effectiveness of ADCLS with respect to ARGOS hinges on the traffic and quality of service demand of the future user constituency. Author

N86-25292*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
BRAILLE READING SYSTEM Patent Application
H. Douglas Garner, inventor (to NASA) Filed 31 Mar. 1986 11 p Sponsored by NASA
(NASA-Case-LAR-13306-1; NAS 1.71:LAR-13306-1;
US-Patent-Appl-SN-846430) Avail: NTIS HC A02/MF A01 CSCL 05B

A Braille reading system wherein the display of characters is controlled by moving a position sensor is developed. A text recorded on a cassette tape is removed by a cassette player under the control of loading logic. The logic controls the cassette player to remove one or two pages of the text at a time. The removed text is stored in buffer memory. One character at a time is retrieved from memory and received by solenoid drivers. These drivers control a series of solenoids and pins to present a standard Braille representation of the character selected. The Braille display is mounted on a mouse which may be manually moved by the operator. When the mouse is moved, an optical pickoff determines the amount of movement of the mouse and forwards signals to an up down counter to record its position. When the mouse is moved a predetermined distance, the character to be displayed is changed to the next character in the text. Author

N86-25293# Maryland Univ., College Park. Computer Vision Lab.
APPLICATION OF HIERARCHICAL DATA STRUCTURES TO GEOGRAPHICAL INFORMATION SYSTEMS Final Report, Nov.

1984 - Nov. 1985
Hanan Samet and Azriel Rosenfeld Dec. 1985 71 p refs
(Contract DAAK70-81-C-0059)
(AD-A163674; ETL-0411) Avail: NTIS HC A04/MF A01 CSCL 08/2

The purposes of this investigation were twofold: (1) to construct a geographic information system based on the quadtree hierarchical data structure; and (2) to gather statistics to allow the evaluation of the usefulness of this approach in geographic information system organization. To accomplish the above objectives, Phase I contained three maps supplied under the terms of the contract. These maps described the floodplain, elevation contours and land use classes of a region in California. In Phase 2, a quadtree-based Geographic Information System was partially implemented, allowing manipulation of images which store area, point and line data. Phase 3 primarily dealt with enhancements and alterations to this information system package, an evaluation of some of the design decisions and the collection of empirical results to indicate the utility of the software and to justify the indicated design decisions. Phase 4 primarily dealt with developing new structures for storing linear feature data. The attribute attachment package was extended to point and linear feature data. Existing area map algorithms were improved to yield significant efficiency speedups by reducing node accesses. The efficiency of the linear quadtree was compared to that of the pixel array for computation of several important geographic functions. GRA

N86-25294# Naval Postgraduate School, Monterey, Calif.
DEFENSE DATA NETWORK/TOPS-20 TUTORIAL: AN INTERACTIVE COMPUTER PROGRAM M.S. Thesis
Mark K. H. Herkert and Sheri L. Smith Dec. 1985 136 p refs
(AD-A163675) Avail: NTIS HC A07/MF A01 CSCL 09/2

The DDNTUT program is an interactive tutorial, located on the ISIA host computer in Marina del Rey, California. The program is designed to first acquaint the new user on the Defense Data Network with the TOPS-20 operating system and its executive level commands. Following this, the user is taken step by step through nine different programs available on TOPS-20, knowledge of which is integral to effective use of the network. The user can, at any time, quit the tutorial, return to previously studied sections and/or skip sections he may be familiar with. GRA

N86-25295# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DESIGN AND IMPLEMENTATION OF A CENTRALIZED DATA DIRECTORY FOR A DISTRIBUTED DATABASE MANAGEMENT SYSTEM M.S. Thesis
James A. Wedertz Dec. 1985 149 p refs
(AD-A163843; AFIT/GCS/ENG/85D-24) Avail: NTIS HC A07/MF A01 CSCL 09/2

This thesis refined and implemented a design of a centralized data directory for distributed database management system (DDBMS) begun in a previous study for use in the AFIT Digital Engineering Laboratory. This directory contains information about all the data stored in the distributed databases. By following the life cycle programming method to develop the system, this project completed a requirements analysis, detailed design and implementation of the directory as well as partial implementation of the DDBMS to test the operation of the centralized data directory. The requirements analysis outlined the functions of the central site which contained the centralized directory. This project used Structured Analysis Design Technique (SADT) diagrams to document the central site's functions. These included initializing the DDBMS, updating the centralized directory, sending changes to other local directories at the remote sites, reconfiguring the DDBMS and servicing requests for information in the directory. Next, the project refined the detailed design of the directory processing and depicted the functional decomposition in structure charts. The following step implemented on two microcomputers only those modules necessary to show how the centralized directory worked. Tests verified that one DDBMS node which received a query could request and receive location information from the other node. GRA

N86-25296# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE DESIGN AND IMPLEMENTATION OF A RELATIONAL TO NETWORK QUERY TRANSLATOR FOR A DISTRIBUTED DATABASE MANAGEMENT SYSTEM M.S. Thesis
Kevin H. Mahoney Dec. 1985 554 p refs
(AD-A164013; AFIT/GCS/ENG/85D-7) Avail: NTIS HC A24/MF A01 CSCL 09/2

A translation program was implemented for the translation of generic relational queries into the Data Management Language (DML) of the TOTAL data base management system. The objectives of this thesis were to propose and detail a method of supporting a global relational query language for a heterogeneous distributed database management system (DDBMS), design generic query translators for the translation of global relational queries into local hierarchical and network DML, and partially implement translation software for the conversion of relational queries into TOTAL DML. The initial portion of the thesis presents an overall analysis of data partitioning, query decomposition and global query management in the DDBMS. Specific proposals are advocated concerning the specific approach to be taken toward a global query manager and the design of the global schema over current databases. The second portion formalizes the assumptions and constraints present in the global relational model, and presents generic algorithms for the translation of relational queries into hierarchical and network DML. The last portion details the implementation and testing of the relational to TOTAL translator. The approach used was to take information returned from the local data directory of the distributed d atabase in response to a relational query, and compile that information into a generated Pascal program containing the TOTAL DML commands. GRA

N86-25297# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A NETWORK MONITORING FACILITY FOR A DISTRIBUTED DATA BASE MANAGEMENT SYSTEM M.S. Thesis
Janice F. Rowe Dec. 1985 132 p refs
(AD-A164129; AFIT/GCS/EE/85D-14) Avail: NTIS HC A07/MF A01 CSCL 09/2

This thesis designed and implemented a hybrid network monitoring facility on an existing Distributed Data Base Management System. Analysis of the performance evaluations goals and objectives for the complete distributed system (both the layered protocol network and distributed data base) was accomplished. Two monitoring programs were developed. The on-line analysis monitor is designed to work with existing software to calculate metrics involving arrival rates, packet counts and arrival times. The off-line analysis monitor, using the packets saved during the on-line session, completes a more detailed analysis, providing user selectable metrics in the area of throughput, response times and utilization. Both programs were extensively tested using a four phased process which encompassed unit level, integration, systems and operational testing. Operational testing was accomplished using an artificial traffic generator program, designed to produce realistic network traffic. GRA

N86-25298# Office of Naval Research, London (England).
EUROPEAN SCIENCE NOTES, VOLUME 40, NUMBER 3 ESN-40-3 HC A03/MF A01 Monthly Report
David L. Venezky Mar. 1986 43 p refs
(AD-A164182; ESN-40-3) Avail: NTIS HC A03/MF A01 CSCL 05/2

European Science Notes is a monthly publication with brief articles on recent developments in European scientific research. Partial contents: Biological sciences; Material Sciences; Mechanics; Physics; and News and Notes. GRA

N86-25299# Office of Management and Budget, Washington, D.C.

MANAGING FEDERAL INFORMATION RESOURCES: REPORT UNDER THE PAPERWORK REDUCTION ACT OF 1980
Sep. 1985 54 p refs
(PB86-247682; AR-4) Avail: NTIS HC A04/MF A01 CSCL 05B

Topics covered include: controlling paperwork (information collection reviews, the information collection budget, other paperwork reduction act activities, legislative activites and issues, delegation of clearance authority); information policy (information technology planning process, federal information policy circular, federal telecommunications systems, security of information technology systems, protecting personal privacy, coordination of U.S. Government information flows in support of international affairs, Office of Management and Budget's leadership role); and statistical policy (long range planning, evaluation, coordination standards, major statistical policy issues addressed in 1984 to 1985). GRA

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N86-25300# Army Aviation Systems Command, St. Louis, Mo.
COST ESTIMATING RELATIONSHIPS FOR FIXED WING AIRCRAFT: LIST PRICE VERSUS EMPTY WEIGHT Final Report
William J. Ditto Sep. 1985 15 p refs
(AD-A164196; USAAVSCOM-TM-85-F-7) Avail: NTIS HC A02/MF A01 CSCL 15/5

This Cost Estimating Relationship (CER) for fixed wing aircraft was developed to estimate the unit cost of a twin engine, commercial, turboprop aircraft procured off the shelf. The Army has a limited fixed wing capability and most of this capability is procured in a commercial environment instead of through a typical rotor wing procurement cycle. The list price in the commercial market includes both engines and standard avionics, while in a typical government rotor wing procurement these items are Government Furnished Equipment. Therefore, this CER was developed using the parameter of empty weight and aircraft commercial list price. The data collected were analyzed using the Statistical Analysis System (SAS) on the AVSCOM Scientific and Engineering Computer System. The program developed is a linear regression of the form (y = a + bx), and the results are shown in the report. GRA

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N86-25301# Committee on Science and Technology (U. S. House).
SCIENCE POLICY STUDY. VOLUME 7: INTERNATIONAL COOPERATION IN SCIENCE
1985 1146 p refs Hearings before the Task Force on Science Policy of the Committee on Science and Technology, 99th Congress, 1st Session, No. 50, 18-20; 27 Jun. 1985
(GPO-52-283) Avail: Committee on Science and Technology

A reuseable orbit transfer vehicle concept was defined and subsequent recommendations for the design criteria of an advanced LO2/LH2 engine were presented. The major characteristics of the vehicle preliminary design include a low lift to drag ratio aerocapture capability, main propulsion failure criteria of fail operational/fail safe and either two main engines with an attitude control system for backup or three main engines to meet the failure criteria. A maintenance and servicing approach was also established for the advanced vehicle and engine concepts. Design tradeoff study conclusions were based on the consideration of reliability, performance, life cycle cost and mission flexibility. BG

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N86-25302*# Stirling Thermal Motors, Inc., Ann Arbor, Mich.
EXPERIMENTAL ASSESSMENT OF ADVANCED STIRLING COMPONENT CONCEPTS Final Report
Benjamin Ziph Oct. 1985 106 p
(Contracts DEN3-351; DE-AI01-77CS-51040)
(NASA-CR-174994; DOE/NASA/0351-1; NAS 1.26:174994) Avail: NTIS HC A06/MF A01 CSCL 10B

The results of an experimental assessment of some advanced Stirling engine component concepts are presented. High performance piston rings, reciprocating oil scrapers and heat pipes with getters and with mechanical couplings were tested. The tests yielded the following results: (1) Bonded, split, pumping piston rings, in preliminary testing, proved a promising concept, exhibiting low leakage and friction losses. Solid piston rings proved impractical in view of their sensitivity to the operating temperature; (2) A babbit oil scraper in a compliant housing performed well in atmospheric endurance testing. In pressurized tests the scraper did not perform well as a containment seal. The latter tests suggest modifications which may adapt Ti successfully to that application; and (3) Heat pipe endurance tests indicated the adequacy of simple, inexpensive fabrication and filling procedures. Getters were provided to increase the tolerance of the heat pipes to the presence of air and commercially available couplings were demonstrated to be suitable for heat pipe application. In addition to the above tests, the program also included a design effort for a split shaft applicable to a swashplate driven engine with a pressurized crank-case. The design is aimed, and does accomplish, an increase in component life to more than 10,000 hours. Author

N86-25303*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
STIRLING POWERED VAN PROGAM OVERVIEW Final Report
Richard K. Shaltens 1986 14 p Presented at the International Congress and Exposition, Detroit, Mich., 24-28 Feb. 1986; sponsored by Society of Automotive Engineers Revised
(Contract DE-AI01-85CE-50112)
(NASA-TM-87227; DOE/NASA-50112/62-Rev; E-2896; NAS 1.15:87227) Avail: NTIS HC A02/MF A01 CSCL 13F

The Stirling Powered Van Program (SPVP) is a multiyear, multiphase program to evaluate the automotive Stirling engine (ASE) in Air Force vans under realistic conditions. The objective of the SPVP is to transfer to manufacturer and end user(s) (i.e., on the path to commercialization) the second-generation Mod 2 ASE upon completion of the Automotive Stirling Engine Program in 1987. In order to meet this objective, the SPVP must establish Stirling performance, integrity, reliability, durability and maintainability. The ASE program background leading to the van program is reviewed and plans for evaluating the kinematic Stirling engine in Air Force vans examined. Also discussed are the NASA technology transfers to industry that have been accomplished and those which are currently being developed. Author

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N86-25304# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
IS G305.8-0.2 A YOUNG OBJECT?
J. W. S. VilasBoas, E. Scalise, Jr., and C. G. Sanzovo Feb. 1986 12 p refs Submitted for publication
(INPE-3787-PRE/882) Avail: NTIS HC A02/MF A01

Observations of water vapor and silicon monoxide were conducted in the direction of G305.8-0.2. No emission of SiO, above 7 Jy of flux density, was detected. The short time water maser variability of the source suggests that it could be a protostellar object. Measurements of the visual extinction distributions in the direction of the water maser source do not show relevant darkness effect. Author

N86-25305*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THERMAL PERFORMANCE EVALUATION OF THE INFRARED TELESCOPE DEWAR SUBSYSTEM
Eugene W. Urban Apr. 1986 127 p ref
(NASA-TM-86543; NAS 1.15:86543) Avail: NTIS HC A07/MF A01 CSCL 03A

Thermal performance evaluations (TPE) were conducted with the superfluid helium dewar of the Infrared Telescope (IRT) experiment from November 1981 to August 1982. Test included measuring key operating parameters, simulating operations with an attached instrument cryostat and validating servicing, operating and safety procedures. Test activities and results are summarized. All objectives are satisfied except for those involving transfer of low pressure liquid helium (LHe) from a supply dewar into the dewar subsystem. E.A.K.

N86-25306 Texas Univ., Austin.
A POLARIMETRIC STUDY OF THE INSTERSTELLAR MEDIUM IN TAURUS DARK CLOUDS Ph.D. Thesis
Jinchung Hsu 1985 180 p
Avail: Univ. Microfilms Order No. DA8527580

An optical linear polarimeter survey was completed for more than 300 stars in an area of 6.5 x 10 deg. toward the Taurus Dark Clouds Complex. The orientation of the magnetic field was roughly perpendicualr to the elongation direction of the dust lanes, indicating cloud contraction along the magnetic field lines. Distance to the front edge of the dark clouds in Taurus was determined to be 126 pc. There was only an insignificant amount of obscuring material between the cloud complex and the sun. Beside the polarization data, the reddenings of about 250 stars were also obtained from the UBV photometry. The mean polarization to reddening ratio in the Taurus region was 4.6, which is similar to that of the general interstellar matter. A statistical analysis was carried out for the reddening and polarization data of the Taurus region. The characteristic scale of the fluctuations was about 0.5 pc for both the reddening and the Stokes parameters, if an exponential correlation function was added. Dissert. Abstr.

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N86-25307* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INTERNATIONAL ULTRAVIOLET EXPLORER ATLAS OF O--TYPESPECTRA FROM 1200 TO 1900 ANGSTROM
Nolan R. Walborn (Space Telescope Science Inst., Baltimore, Md.), Joy Nichols-Bohlin, and Robert J. Panek (Wellesley Coll.) Dec. 1985 153 p
(NASA-RP-1155; NAS 1.61:1155) Avail: NTIS HC A08/MF A01 CSCL 03B

The IUE archives provide an unprecedented sample of uniform, high-quality ultraviolet stellar spectra. In particular, they contain high-resolution SWP data for nearly 200 different O stars. We have undertaken a survey of the 1200-1900 A region in about 120 of them having homogeneous optical spectral classifications to investigate systematically the behavior of the ultraviolet features, incuding the prominent stellar wind profiles and the degree to which they correlate with the optical types. The standard extracted spectrograms have been rebinned to a constant wavelength resolution of 0.25A and uniformly normalized (not dereddened) at the GSFC RDAF. They are then plotted at 10A/cm, with reseau, photometric quality and echelle order junction flags available. This atlas contains such plots for about 100 stars, arranged in spectral-type, luminosity and peculiar object sequences. The results show a high degree of correlation between the ultraviolet features, both photospheric and stellar-wind, and the optical classifications for the majority of the O-type stars. Author

N86-25308 Princeton Univ., N. J.
ON STELLAR STREAMING MOTIONS IN TRIAXIAL OBJECTS: THE CASE OF THE GALACTIC BULGE Ph.D. Thesis
Mario Vietri 1985 69 p
Avail: Univ. Microfilms Order No. DA8529049

The dynamical consequences of the hypothesis that the gas ring which is seen in HI emission to be tilted by 22 deg to the galactic plane, is in steady state, i.e. that it circulates on closed, stable, non-self-interesecting orbits tilted with respect to the galactic disk is studied. This implies that the galactic bulge is triaxial and that its figure is rotating in the direction opposite to that of the disk material. The rotation period of the bulge is determined by requiring that the potential has an anomalous orbit of the correct size at the observed tilt. The bulge is modeled as a triaxial object with axial ratios and rotation period. These values are consistent with those needed to explain an analogous feature detected in CO-13 and a relation of the model with observations of the inner pc is suggested. Two self-consistent models were constructed for a bulge immersed in the galactic potential modeled by Bahcall et al. Dissert. Abstr.

N86-25309 Texas Univ., Austin.
MOLECULAR OUTFLOWS AND MASS LOSS IN PRE-MAIN-SEQUENCE STARS Ph.D. Thesis
Russel Martin Levreault 1985 359 p
Avail: Univ. Microfilms Order No. DA8529878

A survey for molecular outflows toward pre-main-sequence stars using the J = 2 yields 1 transition CO was conducted. Outflows were detected toward 21 of these objects. The outflow sources range in mass from 0.5 to 30 solar mass in luminosity from 4 to 1.1 x 10 to the 5th power solar luminosity and in age from < 10,000 to 1 million years. In the H-R diagram the outflow sources form a distinct band running across the top of the diagram. In addition to the CO(J = 2 to 1 data, we have obtained CO(J = 1 to 0) and CO-13 (J = 1 to 0) observations which enable use to estimate the excitation temperature and optical depth in each outflow, leading to the derivation of outflow masses. The observed outflows range in age from approximately 1000 to 500,000 years old and have masses from 0.01 to 56 solar mass. Simple momentum conservation arguments are then used to deduce the mass loss necessary to produce the observed outflows; the results range from 9 x 10 to the -9 power to 8 x 10 to the -4 power Solar mass/yr. The observed pre-main-sequence winds could have important consequences for planetary formation, particularly of the terrestrial planets. Quantitative tests of self-regulated low-mass star formation suggest that this mechanism can support a 100 A survey for molecular outflows toward pre-main-sequence stars using the J = yields 1 solar mass molecular cloud against collapse for 50 million years. Such a lifetime can explain the observed age spread in nearby star forming regions. Dissert. Abstr.

N86-25310*# Akron Univ., Ohio. Dept. of Civil Engineering.
EFFECTS OF STATE RECOVERY ON CREEP BUCKLING UNDER

VARIABLE LOADING Final Report
D. N. Robinson and S. M. Arnold Apr. 1986 45 p refs
(Grant NAG3-379)
(NASA-CR-175094; NAS 1.26:175094) Avail: NTIS HC A03/MF A01 CSCL 03B

Structural alloys embody internal mechanisms that allow recovery of state with varying stress and elevated temperature, i.e., they can return to a softer state following periods of hardening. Such material behavior is known to strongly influence structural response under some important thermomechanical loadings, for example, that involving thermal ratchetting. The influence of dynamic and thermal recovery on the creep buckling of a column under variable loading is investigated. The column is taken as the idealized (Shanley) sandwich column. The constitutive model, unlike the commonly employed Norton creep model, incorporates a representation of both dynamic and thermal (state) recovery. The material parameters of the constitutive model are chosen to characterize Narloy Z, a representative copper alloy used in thrust nozzle liners of reusable rocket engines. Variable loading histories include rapid cyclic unloading/reloading sequences and intermittent reductions of load for extended periods of time; these are superimposed on a constant load. The calculated results show that state recovery significantly affects creep buckling under variable loading. Structural alloys embody internal mechanisms that allow recovery of state with varying stress and time. Author

N86-25311*# Lick Observatory, Santa Cruz, Calif.
METALLICITY AND THE LEVEL OF THE ULTRAVIOLET RISING BRANCH IN ELLIPTICAL GALAXIES Final Report, 1 Jul. 1984 - 31 Mar. 1986
Sandra M. Faber 1986 8 p
(Grant NAG5-436)
(NASA-CR-176670; NAS 1.26:176670) Avail: NTIS HC A02/MF A01 CSCL 03B

This final report concerns a project to study the systematics of the ultraviolet flux level in elliptical galaxies. Prior to the inception of this work, the systematic behavior of the ultraviolet flux level was basically unknown and ultraviolet fluxes were observed to vary greatly from galaxy to galaxy. There was a suggestion, however, that there might be a dependence of ultraviolet flux on galaxy metallicity, but the correlation was based on just six galaxies. IUE spectra of elliptical galaxies have been reanalyzed and placed on a consistent, homogenous flux system. The major conclusion is a confirmation of the original hypothesis: galaxies with stronger Mg2 lines show enhanced ultraviolet flux. Author

N86-25312# Massachusetts Inst. of Tech., Cambridge. Lincoln Lab.
THE ANALYSIS OF NEAR-EARTH SATELLITE ASTROMETRIC DATA AT THE ETS
Laurence G. Taff 12 Dec. 1985 31 p refs
(Contract F19628-85-C-0002)
(AD-A163902; ETS-76; ESD-TR-85-263) Avail: NTIS HC A03/MF A01 CSCL 22/3

The activities at the ETS have expanded from observations of deep-space artificial satellites during the dark hours to observations of near-Earth satellites near noon. Not only do these varying tasks require different video cameras and associated equipment, they can benefit from a tailored analysis of the resulting astrometric data. In particular, the observation of near-Earth artificial satellites very near the astronomical zenith has become a frequent mode of operation. For some of these satellites, a parallax can be discerned when both ETS telescopes are used. For others, their nearly circular orbit coupled with a zenith passage suffices to fix their element set. GRA

N86-25313# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN ANALYSIS OF THE ACCESSIBILITY OF EARTH-APPROACHING ASTEROIDS M.S. Thesis
Philip W. Somers Dec. 1985 149 p refs
(AD-A163976; AFIT/GSO/AA/85D-1) Avail: NTIS HC A07/MF A01 CSCL 22/3

The purpose of this thesis is to analyze the accessibility of Earth-approaching asteroids using a computer program that was practical to run on a microcomputer. This analysis employs techniques that can easily be adapted to find optimal trajectories for a variety of orbital intercept applications. The mathematical analysis was adapted from recently developed algorithms that were designed to run on main frame computers using extensive software libraries and data resources. The computer program developed for this paper was designed to operate on an IBM PC equipped with an 8087 math co-processor chip. Programming was done in Turbo PASCAL Version 3.0 which supports the 8087 mathematical capabilities. The program was designed to be self contained except for data files of orbital elements. The program was also designed to operate efficiently and quickly while retaining much of the accuracy found on the main frame implementations. Only nonperturbed Keplerian motion was modelled. Every effort was made to ensure the program was as flexible as possible. Any object in the solar system in heliocentric orbit can be used as either the departure or arrival body. Orbital element data files are included for all the planets, several periodic comets, all the recently discovered Earth-approaching asteroids and many of the main belt asteroids. This flexibility permits not only rendezvous missions to be calculated, but can just as easily handle fly by trajectories and return-to-Earth missions. GRA

N86-25314 Clemson Univ., S.C.
B AND V PHOTOELECTRIC PHOTOMETRY AND LIGHT CURVE SOLUTION OF THE INTERACTING BINARY SYSTEMS HI PUPPIS, BL ERIDANI AND SY HOROLOGII Ph.D. Thesis
James Robert Kern 1985 265 p
Avail: Univ. Microfilms Order No. DA8527702

The first photoelectric observations of the eclipsing binary systems HI Puppis, BL Eridani and SY Horologii were obtained and complete B and V lights curves are presented. Improved light elements were derived for all three systems. The light curves of HI Puppis were analyzed by the computer models of Wilson and Devinney, Binnendijk and Wood to get the geometrical and photometric elements of the system. HI Puppis is shown to be a classic A type W Ursae Majoris system. The BL Eridani system is found to be a near contact system with the primary component filling its Roche lobe and the secondary nearly filling its lobe with a fill out ratio of approximately 1.0. The SY Horologii system is a near contact system with the secondary component filling its Roche lobe and the primary nearly filling its lobe with a fill out ratio of approximately 1.0. Dissert. Abstr.

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

N86-25315*# National Aeronautics and Space Administration, Washington, D.C.
PRELIMINARY RESULTS OF THE VEGA 1 AND VEGA 2 OPTICAL INVESTIGATION OF AEROSOL IN THE ATMOSPHERE OF VENUS AT 30-60 KM
B. Ye. Moshkin, V. I. Moroz, V. I. Gnedykh, and A. V. Grigoryev Apr. 1986 14 p refs Transl. into ENGLISH from Predvaritelnyye Rezultaty Opticheskikh Issledovaniy Aerozolnoy Sredy v Atmosfere Venery na Vysotakh 30-60 km s Pomoshchyu AMS Vega-1 i Vega-2, Pisna v AZH (USSR), v. 12, no. 1,1986 p 85-93 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. was prep. by Academy of Sciences Space Research Inst., Moscow, USSR
(Contract NASw-4005)
(NASA-TM-88414; NAS 1.15:88414) Avail: NTIS HC A02/MF A01 CSCL 03B

Aerosol concentration profiles were measured by an aerosol spectrometer above the landing sites of the Vega 1 and Vega 2

landers. Approximately the same altitude zones were found as in previous experiments: a three-layered basic cloud cover, an intermediate zone and subcloud haze. There were significant quantitative differences in the concentrations of particles, however, and especially in the spectra of their dimensions. Nightglow was found in the troposphere of Venus at a wavelength of about 1 micron. The backscatter coefficient and the extinction coefficient change very little between 32 and 63 km. Large numbers of submicron particles apparently exist in the atmosphere above the landing sites. Author

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N86-25316*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE POSSIBLE IMPORTANCE OF SYNCHROTRON/INVERSE COMPTON LOSSES TO EXPLAIN FAST MM-WAVE AND HARD X-RAY EMISSION OF A SOLAR EVENT
E. Correia (Instituto de Pesquisas Espaciais, Sao Jose dos Campos, Brazil), P. Kaufmann (Instituto de Pesquisas Espaciais, Sao Jose dos Campos, Brazil), J. E. R. Costa (Instituto de Pesquisas Espaciais, Sao Jose dos Campos, Brazil), A. M. Zodi Vaz (Instituto de Pesquisas Espaciais, Sao Jose dos Campos, Brazil), and B. R. Dennis Feb. 1986 11 p refs Presented at the SMM Topical Workshop on Rapid Fluctuations in Solar Flares, Lanham, Md., 30 Sep. - 4 Oct. 1985 Submitted for publication
(NASA-TM-88659; NAS 1.15:88659; INPE-3809-PRE/895) Avail. NTIS HC A02/MF A01 CSCL 03B

The solar burst of 21 May 1984 presented a number of unique features. The time profile consisted of seven major structures (seconds), with a turnover frequency > or approx. 90 GHz, well correlated in time to hard X-ray emission. Each structure consisted of multiple fast pulses (.1 seconds), which were analyzed in detail. A proportionality between the repetition rate of the pulses and the burst fluxes at 90 GHz and > or approx. 100 keV hard X-rays, and an inverse proportionality between repetition rates and hard X-rays power law indices have been found. A synchrotron/inverse Compton model has been applied to explain the emission of the fast burst structures, which appear to be possible for the first three or four structures. Author

93 SPACE RADIATION

Includes cosmic radiation; and inner and outer Earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N86-25317# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
GAMMA-RAY BACKGROUND INDUCED IN A DOUBLE Ge(LI) SPECTROMETER AT BALLOON ALTITUDES IN THE HEMISPHERE
N. A. BuiVan, J. Braga, J. O. D. Jardim, and G. Vedrenne Feb. 1986 26 p refs Submitted for publication Sponsored in part by Fundo Nacional de Desenvolvimento Cientifico e Tecnologico
(INPE-3797-PRE/892) Avail: NTIS HC A03/MF A01

A double coaxial Ge(Li) spectrometer was flown in the Southern Hemisphere to study the induced background at ceiling in the diodes. During the flight, different anticoincidence modes were operated to estimate the local production. The atmospheric 511 KeV line results show that the fluxes detected by the upper diode are in good agreement with previous measurements and indicate a probable contamination of the lower diode. The techniques demonstrate a promising method to reject induced background in the gamma-ray Ge(Li) telescope. E.A.K.

N86-25318 Washington Univ., Seattle.
ABUNDANCES OF HEAVY COSMIC RAYS AT ENERGIES UP TO 1000 GeV/amu Ph.D. Thesis
Michael David Jones 1985 172 p
Avail: Univ. Microfilms Order No. DA8529973

Using the Heavy Nuclei Experiment (HNE) aboard the third High Enery Astronomy Observatory, abundances were measured for the elements from Ar-18 to Ni-28 from energies of 500 MeV/amu to nearly 1000 GeV/amu. This extends the energy scale for single elements in this charge region by an order of magnitude. In particular, the technique of using the relativistic rise in an ion chamber as a measure of energy for heavy nuclei combined with the large area and exposure of the HNE have allowed exploration of this energy region. For the elements expected to be secondary cosmic rays the ratios to Fe can be expressed as simple power laws in energy up to the highest measured energies. For the elements Ar-18 and Ca-20 that have primary components, values were derived for the primary components, independent of galactic propagation calculations. Dissert. Abstr.

N86-25319 Washington Univ., St. Louis, Mo.
ABUNDANCES AND ENERGY SPECTRA OF HIGH ENERGY HEAVY COSMIC-RAY NUCLEI Ph.D. Thesis
Scott Douglas Barthelmy 1985 188 p
Avail: Univ. Microfilms Order No. DA8529963

The relative abundances of the cosmic rays were measured in the iron group region at energies from a few GeV/amu to approximately 70 GeV/amu. This was done using a balloon-borne instrument flown from Palestine, Texas for a total exposure of 62 sq. m/ster/hr at an average atmospheric depth of 4 g/sq. cm. The elemental charge was determined from a combination of the scintillator and plastic Cerenkov detectors. The energy determination was made using the relativistic rise portion of the Bethe-Bloch curve for gas ionization loss chambers. By including previously published cosmic ray Fe energy spectra, the slope of the ion chamber calibration was obtained. Results are reported on the Ti-22/Fe-26, Cr-24/Fe-26, Ca-20/Fe-26, and Ni-28/Fe-26 abundance from 2 to 70 GeV/amu. Dissert. Abstr.

99 GENERAL

N86-25320*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RESEARCH AND TECHNOLOGY, FISCAL YEAR 1985 Annual Report
1985 150 p Original contains color illustrations
(NASA-TM-88753; NAS 1.15:88753) Avail: NTIS HC A07/MF A01 CSCL 05A

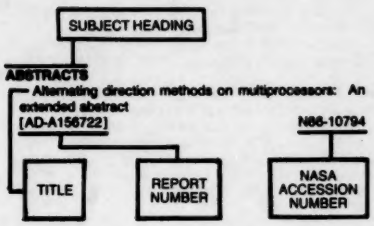
Capabilities in spacecraft subsystems, sensors, space communications and navigation, the acquisition of data from space missions and the extraction of information from that data were reviewed. The use of satellite data in the study of the Earth's atmosphere and climate, the dynamics of its crust and the monitoring of land and water resources were examined. A review of NASA flight projects for 1985 was presented. B.G.

N86-25321*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
RESEARCH AND COMPETITION: BEST PARTNERS
John M. Shaw 1986 12 p Presented at the 90th Casting Congress, Minneapolis, Minnesota, 11-15 May 1986; sponsored by the American Foundrymen's Society
(NASA-TM-87313; E-3044; NAS 1.15:87313) Avail: NTIS HC A02/MF A01 CSCL 05A

NASA's Microgravity Science and Applications Program is directed toward research in the science and technology of processing materials under conditions of low gravity. The objective is to make a detailed examination of the constraints imposed by gravitational forces on Earth. The program is expected to lead

ultimately to the development of new materials and processes in Earth-based commercial applications, adding to this nation's technological base. An important resource that U.S. researchers have readily available to them is the new Microgravity Materials Science Laboratory (MMSL) at NASA Lewis Research Center in Cleveland. A typical scenario for a microgravity materials experiment at Lewis would begin by establishing 1-g baseline data in the MMSL and then proceeding, if it is indicated, to a drop tower or to simulated microgravity conditions in a research aircraft to qualify the project for space flight. A major component of Lewis microgravity materials research work involves the study of metal and alloy solidification fundamentals. Author

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7053).

A

ABRASION
Abrasion and deformed layer formation of manganese-zinc ferrite in sliding contact with lapping tapes
[NASA-TM-87249] N86-24838

ABRASION RESISTANCE
Centerville Beach. Project completion report
[AD-A163461] N86-25056

ABSTRACTS
European Science Notes, Volume 40, Number 3
ESN-40-3 HC A03/MF A01
[AD-A164182] N86-25298

ABUNDANCE
Abundances of heavy cosmic rays at energies up to 1000 GeV/amu N86-25318
Abundances and energy spectra of high energy heavy cosmic-ray nuclei N86-25319

ACCELERATED LIFE TESTS
Development of a test method to determine potential peroxide content in turbine fuels
[AD-A163590] N86-24858
Nickel hydrogen battery cell testing data base: An industry and government survey
[AD-A163017] N86-25051

ACCELERATION (PHYSICS)
Stability of spinning ICBM (intercontinental ballistic missile) in first stage boost phase
[AD-A164019] N86-24724
A proposed design for an interim space rescue ferry vehicle
[AD-A164039] N86-24741
Modification of the ionospheric electron velocity distribution function due to resonant absorption of HF waves
[AD-A163025] N86-25073

ACCELEROMETERS
Gyro and accelerometer based navigation system for a mobile autonomous robot
[AD-A164036] N86-24682

ACCEPTOR MATERIALS
Theoretical investigation of point defects of mercury cadmium telluride A01
[AD-A163735] N86-25277

ACCESS CONTROL
LQG/LTR design of a robust flight controller for the STOL F-15
[AD-A164111] N86-24708

ACCIDENT INVESTIGATION
Report of the Presidential Commission on the Space Shuttle Challenger Accident, volume 1 N86-24726

ACCIDENTS
Report of the Presidential Commission on the Space Shuttle Challenger Accident, volume 1 N86-24726

ACCOUNTING
NASA's FIA (National Aeronautics and Space Administration's Financial Integrity Act) Program: NASA's progress in implementing Financial Integrity Act requirements
[PB86-135100] N86-25288

ACCUMULATORS
Microwave tube collectors. Collector systems of UHF devices with longitudinal interactions
[NASA-TM-88399] N86-24910

ACCURACY
Architecture and numerical accuracy of high-speed DFT (Discrete Fourier Transform) processing systems
[AD-A163963] N86-25132

ACETYLENE
Protected ethynlated phenols
[AD-D012019] N86-24854

ACOUSTIC EMISSION
Detection and location of ballistic damage in composite materials using acoustic emission methods
[AD-A164183] N86-24766

ACOUSTIC IMPEDANCE
A transducer for bottom-scattering measurements
[AD-A163987] N86-25222

ACOUSTIC MEASUREMENT
A transducer for bottom-scattering measurements
[AD-A163987] N86-25222

ACOUSTIC SCATTERING
A transducer for bottom-scattering measurements
[AD-A163987] N86-25222

ACOUSTICS
Reciprocity calibration in a plane wave resonator
[AD-A164149] N86-24972
FORTRAN program for vibration and sound radiation of spherical shell
[AD-A163752] N86-25022
The behavior of cloud droplets in an acoustic field: A numerical investigation
[AD-A163704] N86-25081
Effects of convergence zone multipath on crosscorrelation
[AD-A163650] N86-25221

ACQUISITION
A survey of O and S (Operating and Support) cost models
[AD-A163438] N86-25287

ACRYLATES
A method for fabricating magnetodielectric cores
[AD-A163457] N86-24911

ACTIVATION ENERGY
A dimensional analysis approach for characterizing pryotechnic mixture systems
[AD-A163018] N86-24863
A characterization of the chemical vapor deposition of gallium arsenide and indium phosphide in the hydride and chloride systems
[AD-A164259] N86-25279

ACTIVE CONTROL
A research program in active control/aeroelasticity
[NASA-CR-176773] N86-24702

ACTUATORS
Control of a large space structure using direct output feedback and modal suppression
[AD-A163960] N86-24738
Simulation and performance of brushless dc motor actuators
[AD-A163725] N86-24913

ADA (PROGRAMMING LANGUAGE)
The implementation and use of Ada on distributed systems with high reliability requirements
[NASA-CR-176760] N86-25142
Using Ada in the real-time avionics environment issues and conclusions
[AD-A163844] N86-25151

ADAPTATION
Adaptive-grid optimization for minimizing steady-state, truncation error
[AD-A164038] N86-24948
An adaptive collision resolution protocol for random accessed channels
[AD-A164169] N86-25165

ADAPTIVE CONTROL
Moving-bank multiple model adaptive algorithms applied to flexible spacecraft control
[AD-A164016] N86-24740
Adaptive control techniques for large space structures
[AD-A164240] N86-24742
Adaptive control, learning, and cost-effective sensor systems for robotics or advanced automation systems
[AD-A163615] N86-24996
An application of adaptive learning to malfunction recovery
[NASA-CR-166620] N86-25169
Real-time adaptive control of a robotic manipulator using three-dimensional stereoscopic vision feedback N86-25175

ADAPTIVE FILTERS
Characteristics of Bayesian multiple model adaptive estimation for tracking airborne targets
[AD-A163830] N86-24890

ADDITIVES
Impurity diffusion in NiO grain boundaries
[AERE-R-11763] N86-25280

ADDRESSING
Image segmentation using the military specification 1750A
[AD-A164180] N86-25138

ADHESION
Analytic solution of the molecular Ornstein-Zernike equation for non-spherical molecules spheres with anisotropic surface adhesion
[AD-A163451] N86-24771
Adhesion and the surface behavior of the silicone elastomer
[AD-A163815] N86-24851
Physico-chemical factors affecting hydrothermal resistance and bonding of polymeric composites to steel surfaces
[AD-A163906] N86-24852
Thermal desorption study of physical forces at the PTFE surface
[NASA-TM-87090] N86-25284

ADHESIVE BONDING
Adhesion and the surface behavior of the silicone elastomer
[AD-A163815] N86-24851
Inductive energy for rapid strain guage attachment
[NASA-CASE-LAR-13237-1] N86-24960

ADIABATIC CONDITIONS
Experimental study of the supersonic turbulent boundary layer on a blunted axisymmetric body
[AD-A163736] N86-24669

ADJUSTING
Adjustable mount for electro-optic transducers in an evacuated cryogenic system
[NASA-CASE-LAR-13100-1] N86-24993

AERATION
Lubricant foaming and aeration study, part 2
[AD-A163696] N86-24849

AERIAL PHOTOGRAPHY
Aerial camera research: Accuracy comparison using the ZEISS RMK 15/23 and the JENA LMK aerial cameras
[PB86-126836] N86-24973

AERIAL RECONNAISSANCE
Earth resources: A continuing bibliography with indexes (issue 49)
[NASA-SP-7041(49)] N86-25033
AEROACOUSTICS
Aircraft Noise Prediction Program theoretical manual: Propeller aerodynamics and noise
[NASA-TM-83199] N86-25220
AEROBRAKING
Advanced orbit transfer vehicle propulsion system study
[NASA-CR-174843] N86-24746
AEROCAPTURE
Advanced orbit transfer vehicle propulsion system study
[NASA-CR-174843] N86-24746
AERODYNAMIC CHARACTERISTICS
Aerodynamic characteristics of gas cushion for cylinders
[BLL-M-36671-(5828.4)] N86-24656
USSAERO version D computer program development using ANSI standard FORTRAN 77 and DI-3000 graphics
[NASA-CR-3980] N86-24660
Rotor performance characteristics from an aeroacoustic helicopter wind-tunnel test program
[NASA-TM-87661] N86-24665
Evaluation of propfan propulsion applied to general aviation
[NASA-CR-175020] N86-24695
Evaluating turbine engine operating characteristics
[FAA-AC-25.939-1] N86-24696
Lateral and longitudinal aerodynamic stability and control parameters of the basic vortex flap research aircraft as determined from flight test data
[NASA-TM-87711] N86-24703
Unsteady heat transfer and direct comparison to steady-state measurements in a rotor-wake experiment
[NASA-TM-87220] N86-24934
AERODYNAMIC COEFFICIENTS
Experimental assessment of vortex retaining cavity flaps for maneuverability improvement on delta wing fighter aircraft
[AD-A164104] N86-24690
Statistical prediction of dynamic distortion of inlet flow using minimum dynamic measurement. An application to the Melick statistical method and inlet flow dynamic distortion prediction without RMS measurements
[NASA-CR-176764] N86-24933
AERODYNAMIC CONFIGURATIONS
Study of the effects of discretizing quantitative feedback theory analog control system designs
[AD-A164209] N86-25174
Numerical grid generation for parabolic partial differential equations using marching techniques
[AD-A164020] N86-25196
AERODYNAMIC DRAG
The behaviour and performance of leading edge vortex flaps
[CAR-8601] N86-24666
In-flight measurements of wing ice shapes and wing section drag increases caused by natural icing conditions
[NASA-TM-87301] N86-24667
AERODYNAMIC FORCES
Loads and motions of an F-106B flying through thunderstorms
[NASA-TM-87671] N86-24672
AERODYNAMIC INTERFERENCE
Unsteady transonic flow calculations for wing-fuselage configurations
[NASA-TM-87707] N86-24657
AERODYNAMIC LOADS
Loads and motions of an F-106B flying through thunderstorms
[NASA-TM-87671] N86-24672
AERODYNAMIC STABILITY
Stability of spinning ICBM (intercontinental ballistic missile) in first stage boost phase
[AD-A164019] N86-24724
AERODYNAMICS
Aeronautical Engineering: A continuing bibliography with indexes (supplement 199)
[NASA-SP-7037(199)] N86-24653
Numerical flow field calculations for a missile configuration at M = .6
[AD-A164155] N86-24951
AEROELASTICITY
Unsteady transonic flow calculations for wing-fuselage configurations
[NASA-TM-87707] N86-24657
A research program in active control/aeroelasticity
[NASA-CR-176773] N86-24702
AERONAUTICAL ENGINEERING
Aeronautical Engineering: A continuing bibliography with indexes (supplement 199)
[NASA-SP-7037(199)] N86-24653
Review and critical analysis: Rolling-element bearings for system life and reliability
[NASA-CR-174710] N86-24991
AEROSOLS
Criteria for significance of simultaneous presence of both condensible vapors and aerosol particles on mass transfer (deposition) rates
[NASA-TM-87247] N86-24869
Liquid seeding atomizer
[NASA-CASE-ARC-11631-1] N86-24935
Combined fringe and Fabry-Perot laser anemometer for three component velocity measurements in turbine stator cascade facility
[NASA-TM-87322] N86-24967
Aerosol behavior modeling. Task 3: Support services for research and evaluation of severe accident phenomena and mitigation
[TI86-900242] N86-25067
Preliminary results of the Vega 1 and Vega 2 optical investigation of aerosol in the atmosphere of Venus at 30-60 KM
[NASA-TM-88414] N86-25315
AEROSPACE ENGINEERING
Space Station Systems: A bibliography with indexes (supplement 1)
[NASA-SP-7056(01)] N86-24711
Overview of space technology
[AD-A163887] N86-24715
Research and technology, fiscal year 1985
[NASA-TM-88753] N86-25320
AEROSPACE MEDICINE
USSR Space Life Sciences Digest, issue 5
[NASA-CR-3922(05)] N86-25109
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 284)
[NASA-SP-7011(284)] N86-25111
AGARD Bulletin: Meetings, publications, membership
[AGARD-BULL-86/1] N86-25285
AEROSPACE SYSTEMS
Damping characteristics of metal matrix composites
[AD-A163569] N86-24762
Nickel hydrogen battery cell testing data base: An industry and government survey
[AD-A163017] N86-25051
AEROSPACE TECHNOLOGY TRANSFER
Technology for large space systems: A bibliography with indexes
[NASA-SP-7046(13)] N86-24713
AFRICA
Diagnostic study of atmosphere-terrain interaction leading to the formation of dust clouds and poor visibilities over the near east desert areas
[AD-A163890] N86-25085
AGGLOMERATION
The behavior of cloud droplets in an acoustic field: A numerical investigation
[AD-A163704] N86-25081
AGING (MATERIALS)
Development of a test method to determine potential peroxide content in turbine fuels
[AD-A163590] N86-24858
AGITATION
Silicon distribution in synthetic cast iron
[BLL-M-36689-(5828.4)] N86-24792
AIR COOLING
Dual mode heat exchanger
[AD-D012156] N86-24944
AIR DEFENSE
Our wings A01
[AD-A163608] N86-24654
AIR FLOW
Altitude ignition/lean decel study
[AD-A163052] N86-24781
Dual mode heat exchanger
[AD-D012156] N86-24944
A Model of Airflow and Diffusion In Complex Terrain (MADICT)
[AD-A163819] N86-25083
AIR JETS
Heat transfer in compartment fires near regions of ceiling jet-wall impingement N86-24866
AIR POLLUTION
Removal of sulfur and nitrogen containing pollutants from discharge gases
[DE85-017799] N86-25058
Modeling transport by convective clouds for regional air pollution models
[PB86-144623] N86-25060
Isotopic study of the inhalation toxicology of oxidants
[PB86-109485] N86-25116
AIR QUALITY
Atmospheric modeling: Model and accuracy
[PB86-128683] N86-25062
AIR TO AIR MISSILES
Kalman filter design for the long range intercept function of the F-4E/G fire control system
[AD-A164205] N86-24926
AIR TRAFFIC CONTROL
Pressure based separation in the upper airspace
[CAR-8614] N86-24679
AIRBORNE EQUIPMENT
Airborne bistatic radar limitations and sample calculations
[AD-A163941] N86-24892
AIRBORNE/SPACEBORNE COMPUTERS
Preliminary kalman filter design to improve air combat maneuvering target estimation for the F-4E/G fire control system
[AD-A164034] N86-25200
AIRCRAFT ACCIDENT INVESTIGATION
Aircraft accident/incident summary reports: Denver, Colorado, August 19, 1983; Blountville, Tennessee, July 16, 1983; Tucson, Arizona, February 6, 1983, Cockeysville, Maryland, April 28, 1984; Akron, Ohio, September 30, 1984; Seattle, Washington, October 18, 1984; Miami, Florida, November 11, 1983
[PB85-910409] N86-24675
AIRCRAFT ACCIDENTS
Aircraft accident/incident summary reports: Denver, Colorado, August 19, 1983; Blountville, Tennessee, July 16, 1983; Tucson, Arizona, February 6, 1983, Cockeysville, Maryland, April 28, 1984; Akron, Ohio, September 30, 1984; Seattle, Washington, October 18, 1984; Miami, Florida, November 11, 1983
[PB85-910409] N86-24675
Safety study. Airline passenger safety education: A review of methods used to present safety information
[PB85-917014] N86-24676
AIRCRAFT ANTENNAS
VHF-FM communications antennas for project SINCGARS (UH-1 tail whip and cabin roof bent whip evaluation)
[AD-A163561] N86-24883
AIRCRAFT CONSTRUCTION MATERIALS
AGARD Bulletin: Meetings, publications, membership
[AGARD-BULL-86/1] N86-25285
AIRCRAFT CONTROL
The evaluation of the OSGLR algorithm for restructurable controls
[NASA-CR-178083] N86-24678
An LQG up-and away flight control design for the STOL F-15 aircraft
[AD-A164108] N86-24707
AIRCRAFT DESIGN
A study of a collision avoidance system mounted on a curved ground plane
[NASA-CR-176771] N86-24677
Evaluation of propfan propulsion applied to general aviation
[NASA-CR-175020] N86-24695
Evaluating turbine engine operating characteristics
[FAA-AC-25.939-1] N86-24696
Wind tunnel technology for the development of future commercial aircraft
[NASA-TM-88390] N86-24710
AIRCRAFT ENGINES
Application of artificial intelligence to improve aircraft survivability
[AD-A164172] N86-24674
Evaluating turbine engine operating characteristics
[FAA-AC-25.939-1] N86-24696
AIRCRAFT EQUIPMENT
Frameless transparencies for aircraft cockpit enclosures
[AD-D012155] N86-24689
A review of the pilot backache problem in the CH113 Labrador helicopter
[AD-A164011] N86-25113
AIRCRAFT MAINTENANCE
Automating knowledge acquisition in a flightline robot
[AD-A163829] N86-24997
AIRCRAFT MANEUVERS
Use of state estimation to calculate angle-of-attack position error from flight test data
[AD-A163962] N86-24670
Lateral and longitudinal aerodynamic stability and control parameters of the basic vortex flap research aircraft as determined from flight test data
[NASA-TM-87711] N86-24703
Multivariable control law design for enhanced air combat maneuvering. F-15/STOL (Short Take-Off and Landing) derivative fighter
[AD-A164017] N86-24706

Preliminary kalman filter design to improve air combat maneuvering target estimation for the F-4E/G fire control system
[AD-A164034] N86-25200

AIRCRAFT MODELS
A study of a collision avoidance system mounted on a curved ground plane
[NASA-CR-176771] N86-24677
Multivariable control law design for enhanced air combat maneuvering. F-15/STOL (Short Take-Off and Landing) derivative fighter
[AD-A164017] N86-24706

AIRCRAFT NOISE
Rotor performance characteristics from an aeroacoustic helicopter wind-tunnel test program
[NASA-TM-87661] N86-24665
An estimate of the enroute noise of an advanced turboprop airplane NASA-TM-87302 E-3020 NAS 1.15:87302 HC A02/MF A01
[NASA-TM-87302] N86-25217
An experimental investigation of reducing advanced turboprop cabin noise by wing shielding
[NASA-TM-87112] N86-25218
Aircraft Noise Prediction Program theoretical manual: Propeller aerodynamics and noise
[NASA-TM-83199] N86-25220

AIRCRAFT RELIABILITY
Evaluating turbine engine operating characteristics
[FAA-AC-25.939-1] N86-24696

AIRCRAFT SAFETY
Ice detector
[NASA-CASE-LAR-13403-1] N86-24673
Safety study. Airline passenger safety education: A review of methods used to present safety information
[PB85-917014] N86-24676

AIRCRAFT STRUCTURES
Ice detector
[NASA-CASE-LAR-13403-1] N86-24673
Application of artificial intelligence to improve aircraft survivability
[AD-A164172] N86-24674
Evaluation of capillary reinforced composites
[NASA-CR-175061] N86-24760
AGARD Bulletin: Meetings, publications, membership
[AGARD-BULL-86/1] N86-25285

AIRCRAFT SURVIVABILITY
Application of artificial intelligence to improve aircraft survivability
[AD-A164172] N86-24674

AIRFOILS
R4 airfoil data corrected for sidewall boundary-layer effects in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TP-2565] N86-24662
ALESEP. Part 2: A computer program for the analysis of leading edge separation bubbles on infinite swept wings
[NASA-CR-178015] N86-24664
In-flight measurements of wing ice shapes and wing section drag increases caused by natural icing conditions
[NASA-TM-87301] N86-24667
An experimental investigation on location of boundary layer transition on the NACA 0012 using surface hot film gages
[NASA-TM-88285] N86-24936
Life prediction and constitutive models for engine hot section anisotropic materials program
[NASA-CR-174952] N86-25003

AIRFRAMES
Frameless transparencies for aircraft cockpit enclosures
[AD-D012155] N86-24689
Constant-Load-Amplitude fatigue crack growth testing of cast aluminum alloys A201-T7 and A357-T6
[AD-A163494] N86-24821

AIRPORTS
Computed centerline MLS (Microwave Landing System) approach demonstration at Washington National Airport
[AD-A163722] N86-24681

AIRSPACE
Pressure based separation in the upper airspace
[CAR-8614] N86-24679

ALASKA
Outer Continental Shelf Environmental Assessment Program. Reports of principal investigators, volume 33
[PB86-134780] N86-25061

ALCOHOLS
Mechanisms of combustion of hydrocarbon/alcohol fuel blends
[AD-A163737] N86-24776
Development of 3 and 5 kW fuel cell power plants
[AD-A163603] N86-25047
Development of partial oxidizer/reformer for PAFC power plants
[AD-A163781] N86-25049

ALGEBRA
A theory for classified quantities
[INPE-3788-PRE/883] N86-25178
Energy and chemical change
[AD-A164147] N86-25231

ALGORITHMS
The evaluation of the OSGLR algorithm for restructurable controls
[NASA-CR-178083] N86-24678
A real-time simulation evaluation of an advanced detection, isolation and accommodation algorithm for sensor failures in turbine engines
[NASA-TM-87289] N86-24697
Eigenstructure assignment and its application in design of flight control systems
[NASA-TM-88411] N86-24701
Distributed FIFO allocation of identical resources using small shared space
[AD-A163988] N86-24716
Estimation of ICBM (intercontinental ballistic missile) performance parameters
[AD-A164021] N86-24725
Moving-bank multiple model adaptive algorithms applied to flexible spacecraft control
[AD-A164016] N86-24740
NCTR using a polarization-agile coherent radar system
[AD-A163528] N86-24882
Algorithm definition for the VLSI design implementation of the electromagnetic radiation integral
[AD-A163825] N86-24888
Time domain algorithms
[AD-A163054] N86-24895
Arithmetic circuitry for high speed VLSI Winograd Fourier transform processor
[AD-A163943] N86-24917
Low pass filters with linear phase
[AD-A163984] N86-24920
Control circuitry for high speed VLSI (Very Large Scale Integration) winograd fourier transform processors
[AD-A164043] N86-24921
Determination of stress state from strain state
[BLL-M-36642-(5828.4)] N86-25015
Nonlinear earthquake analysis of concrete building structures
[AD-A163517] N86-25021
Development of a run time math library for the 1750A airborne microcomputer
[AD-A163905] N86-25131
Architecture and numerical accuracy of high-speed DFT (Discrete Fourier Transform) processing systems
[AD-A163963] N86-25132
A trust region algorithm for nonlinearly constrained optimization
[AD-A163986] N86-25154
Parallel processing of region boundaries
[AD-A164112] N86-25157
Analysis of a distributed decision algorithm
[AD-A164181] N86-25159
Reasoning in real-time for the pilot associate: An examination of a model based approach to reasoning in real-time for artificial intelligence systems using a distributed architecture
[AD-A163947] N86-25171
Surface construction from planar contours
[AD-A163610] N86-25184
Improved interval bounds for ranges of functions
[AD-A163627] N86-25187
A new method for computing the generalized inverses of a matrix and its application to the Lyapunov matrix equation
[AD-A163840] N86-25194
Exploratory projection pursuit
[AD-A163019] N86-25207
High temperature gas energy transfer
[AD-A163020] N86-25229
The design and implementation of a relational to network query translator for a distributed database management system
[AD-A164013] N86-25296
An analysis of the accessibility of Earth-approaching asteroids
[AD-A163976] N86-25313

ALIGNMENT
Reverse-wave suppressor mirror effects on CW HF unstable ring laser performance
[AD-A163529] N86-24979
Adjustable mount for electro-optic transducers in an evacuated cryogenic system
[NASA-CASE-LAR-13100-1] N86-24993

ALIPHATIC COMPOUNDS
Mechanisms of combustion of hydrocarbon/alcohol fuel blends
[AD-A163737] N86-24776
Radical fluorescence studies with liquid propellants
[AD-A163472] N86-24857

ALKALINE EARTH METALS
Enthalpies of mixing of alkaline-earth metals with iron and nickel
[BLLD-5828.4-M-36625] N86-24806

ALKYL COMPOUNDS
Synthesis of alkyl and aryl phosphazene high polymers
[AD-A163543] N86-24846
Protected ethynylated phenols
[AD-D012019] N86-24854

ALLOYS
Relying on progress of technology, to develop our alloy steel
[AD-A163690] N86-24825
Method to reveal microstructures in single phase alloys
[AD-D012020] N86-24826
Theoretical investigation of point defects of mercury cadmium telluride A01
[AD-A163735] N86-25277

ALPHA PARTICLES
Active diagnostics of magnetically confined alpha particles by pellet injection
[IPPJ-757] N86-25252

ALTERNATING CURRENT
Development of 3 and 5 kW fuel cell power plants
[AD-A163603] N86-25047

ALTIMETERS
Pressure based separation in the upper airspace
[CAR-8614] N86-24679
Reliability of navigation service provided by the global positioning system
[AD-A163541] N86-24680

ALTITUDE
Altitude ignition/lean decel study
[AD-A163052] N86-24781

ALUMINUM
Diffusion oxygen barrier coating A02/MF A01
[NASA-CASE-LAR-13474-1-SB] N86-24814

ALUMINUM ALLOYS
Damping properties os granule-based composite materials
[BLL-M-36692-(5828.4)] N86-24754
Damping characteristics of metal matrix composites
[AD-A163569] N86-24762
The heat treatment of Ti-Al-V system alloy foil produced by vacuum precipitation
[BLLD-5828.4-M-36668] N86-24801
Constant-Load-Amplitude fatigue crack growth testing of cast aluminum alloys A201-T7 and A357-T6
[AD-A163494] N86-24821
Synthesis and properties of elevated temperature P/M aluminum alloys
[AD-A164158] N86-24827
Cracking resistance in a 4.5-inch (114-mm) plate of 7075-T7351 aluminum alloy
[AD-A164229] N86-24829
A preliminary study of ester oxidation on an aluminum surface using chemiluminescence
[NASA-TM-87242] N86-24835

ALUMINUM BORON COMPOSITES
A mixture model for unidirectionally fiber-reinforced composites
[AD-A164136] N86-24764

ALUMINUM OXIDES
Magnetic susceptibility of Fe-Cr-O alloys
[BLL-M-36643-(5828.4)] N86-24812
Joining of ceramics for advanced heavy-duty diesels
[NASA-CR-175019] N86-24846

AMBIENT TEMPERATURE
Emissions from a light-duty diesel: Ambient temperature and fuel effects
[PB86-131349] N86-24865

AMINES
CARS (Coherent Anti-Stokes Raman Scattering) spectroscopy of the reaction zone of methane-nitrous oxide and RDX propellant flames
[AD-A163465] N86-24773

AMINO ACIDS
Multidisciplinary studies on excitatory amino acids as transmitters in the brain
[AD-A164258] N86-25115

AMMONIUM NITRATES
Radical fluorescence studies with liquid propellants
[AD-A163472] N86-24857

AMMUNITION
Measurement of interior ballistic performance using FM/FM radio telemetry techniques
[AD-A164150] N86-24728

AMORPHOUS MATERIALS
Diffusion oxygen barrier coating A02/MF A01
[NASA-CASE-LAR-13474-1-SB] N86-24814
Abrasion and deformed layer formation of manganese-zinc ferrite in sliding contact with lapping tapes
[NASA-TM-87249] N86-24838

Crack healing in polymers
[AD-A164130] N86-24856
Auger electron spectroscopy, secondary ion mass spectroscopy and optical characterization of a-C-H and BN films
[NASA-TM-87258] N86-25268

AMPLIFIERS
Partial-discharge tests of multiwinding high-voltage transformers for space TWTAs (Traveling-Wave Tube Amplifiers)
[AD-A163882] N86-24915

AMPLITUDE MODULATION
Time domain referencing in intensity modulation fiber optic sensing systems
[NASA-CR-175109] N86-24691
Detection and exploitation of vibration induced optical amplitude modulation
[AD-A164179] N86-25244

AMPLITUDES
Spectral characteristics of radar echoes from aircraft-dispensed chaff N86-24904

ANALOG CIRCUITS
Design of a digital controller for an ultragravimetric microbalance
[AD-A164014] N86-24971

ANALOG COMPUTERS
Development of a Digital Interactive Controller Evaluation System (DICES)
[AD-A163966] N86-25164

ANALOG TO DIGITAL CONVERTERS
A schlieren and hot-wire investigation of karman vortex streets
[AD-A164101] N86-24949

ANALYSIS (MATHEMATICS)
Analytic solution of the molecular Ornstein-Zernike equation for non-spherical molecules spheres with anisotropic surface adhesion
[AD-A163451] N86-24771
A trust region algorithm for nonlinearly constrained optimization
[AD-A163986] N86-25154
A theory for classified quantities
[INPE-3788-PRE/883] N86-25178
Higher order residual analysis for nonlinear time series with autoregressive correlation structures
[AD-A163611] N86-25185
Connecting mathematics, science and high technology: Research on solutions to nonlinear partial differential equations, bifurcation phenomena, and constructive methods for implementing the calculus of variations for relevant, physical problems
[AD-A162827] N86-25197
An analysis of the accessibility of Earth-approaching asteroids
[AD-A163976] N86-25313

ANALYSIS OF VARIANCE
Robust/resistant techniques of data analysis
[AD-A163972] N86-25153
A test for program effect in the absence of a proper control group
[AD-A163783] N86-25204

ANGLE OF ATTACK
A numerical analysis applied to high angle of attack three-dimensional inlets
[NASA-TM-87298] N86-24658
Experimental study of the supersonic turbulent boundary layer on a blunted axisymmetric body
[AD-A163736] N86-24669
Use of state estimation to calculate angle-of-attack position error from flight test data
[AD-A163962] N86-24670
Experimental assessment of vortex retaining cavity flaps for maneuverability improvement on delta wing fighter aircraft
[AD-A164104] N86-24690

ANGLES (GEOMETRY)
Reliability of navigation service provided by the global positioning system
[AD-A163541] N86-24680
Reverse-wave suppressor mirror effects on CW HF unstable ring laser performance
[AD-A163529] N86-24979
Electron precipitation patterns in the vicinity of a VLF transmitter
[AD-A163716] N86-25072

ANGULAR MOMENTUM
High temperature gas energy transfer
[AD-A163020] N86-25229

ANGULAR VELOCITY
Gyro and accelerometer based navigation system for a mobile autonomous robot
[AD-A164036] N86-24682
The effect of energy dissipation due to friction at the joint of a simple beam structure
[AD-A163975] N86-24739

ANISOTROPIC FLUIDS
Analytic solution of the molecular Ornstein-Zernike equation for non-spherical molecules spheres with anisotropic surface adhesion
[AD-A163451] N86-24771

ANISOTROPIC MEDIA
Stress waves in transversely isotropic media: The homogeneous problem
[NASA-CR-3977] N86-25002

ANISOTROPIC PLATES
The determination of the natural frequencies and mode shapes for anisotropic laminated plates including the effects of shear deformation and rotatory inertia
[AD-A164040] N86-24763

ANISOTROPY
Anisotropy of high temperature strength in precipitation-hardened nickel-base superalloy single crystals
[NASA-TM-88387] N86-24815
Tail anisotropy instability during plasma current rise by lower-hybrid waves in a tokamak
[IPPJ-756] N86-25251
Excitation anisotropy in laser-induced-fluorescence spectroscopy: Broad-line excitation case
[IPPJ-761] N86-25254

ANNEALING
Influence of annealing temperature on ductile properties of steel wire
[BLL-M-36645-(5828.4)] N86-24810

ANNIHILATION REACTIONS
Positron annihilation studies of very fine structured materials
[AD-A163822] N86-25225

ANNUAL VARIATIONS
Forecast of Atlantic seasonal hurricane activity for 1986 N86-25080
Diagnostic study of atmosphere-terrain interaction leading to the formation of dust clouds and poor visibilities over the near east desert areas
[AD-A163890] N86-25085
Monthly and seasonal weather outlook for January 1986, volume 40, number 1, December 31, 1985
[PB86-142270] N86-25092
Monthly and seasonal weather outlook for mid-January to mid-February 1986, volume 40, number 2, January 14, 1986
[PB86-145826] N86-25093
Monthly maps of sea level anomalies in the Pacific, 1975 1981. Report on the IGOSS (Integrated Global Ocean Services System) Sea Level Pilot Project
[AD-A163061] N86-25104

ANOMALIES
Interparticle interference during light scattering by submicroinhomogeneous glass
[NASA-TM-88407] N86-24843
Dynamically supported geoid highs over hotspots: Observation and theory
[NASA-CR-176766] N86-25069
Evaluation of NOGAPS 2.1 (Navy Operational Global Atmospheric Prediction System 2.1) systematic error - winter 1983 - 1984
[AD-A163812] N86-25082
Monthly maps of sea level anomalies in the Pacific, 1975 1981. Report on the IGOSS (Integrated Global Ocean Services System) Sea Level Pilot Project
[AD-A163061] N86-25104

ANTARCTIC REGIONS
Earth science investigations in the United States Antarctic Research Program (USARP) for the period July 1, 1984 - June 30, 1985
[PB86-143773] N86-25076

ANTENNA ARRAYS
Physical optics model of side lobe nulling by discs on a parabolic reflector
[AD-A163826] N86-24889
Research on devices for integrated millimeter wave systems
[AD-A163903] N86-24916

ANTENNA FEEDS
Physical optics model of side lobe nulling by discs on a parabolic reflector
[AD-A163826] N86-24889

ANTENNA RADIATION PATTERNS
Algorithm definition for the VLSI design implementation of the electromagnetic radiation integral
[AD-A163825] N86-24888
Physical optics model of side lobe nulling by discs on a parabolic reflector
[AD-A163826] N86-24889

ANTENNAS
Satellite voice broadcast system study, volume 2
[NASA-CR-174905] N86-24877
Measurement apparation and procedure for the determination of surface emissivities
[NASA-CASE-LAR-13455-1] N86-24880
Joint services electronics program
[AD-A164151] N86-24924

ANTHROPOMETRY
Physical, anthropometrical, and body composition characteristics of workers at Kennedy Space Center
[NASA-TM-83102] N86-25122

ANTIFRICTION BEARINGS
The design and construction of a magnetic bearing
[AD-A163552] N86-24995

ANTIMISSILE DEFENSE
The effect of energy dissipation due to friction at the joint of a simple beam structure
[AD-A163975] N86-24739

APERTURES
Electromagnetic scattering from a slotted TM cylindrical conductor by the pseudo-image method
[AD-A163782] N86-24887
Remote measurement of the atmospheric isoplanatic angle and determination of refractive turbulence profiles by direct inversion of the scintillation amplitude covariance function with Tikhonov regularization
[AD-A163629] N86-25239

APPLICATIONS PROGRAMS (COMPUTERS)
Statistical correlation analysis for comparing vibration data from test and analysis
[NASA-TM-86081] N86-25018

APPROACH
Computed centerline MLS (Microwave Landing System) approach demonstration at Washington National Airport
[AD-A163722] N86-24681
Reasoning in real-time for the pilot associate: An examination of a model based approach to reasoning in real-time for artificial intelligence systems using a distributed architecture
[AD-A163947] N86-25171

APPROXIMATION
Shifting the closed-loop spectrum in the optimal linear quadratic regulator problem for hereditary systems
[NASA-CR-178082] N86-25167
Poisson approximation of Bernoulli point processes and their superpositions, via coupling
[AD-A163442] N86-25181
Maximum likelihood recursion and stochastic approximation in sequential designs
[AD-A163628] N86-25188
Numerical grid generation for parabolic partial differential equations using marching techniques
[AD-A164020] N86-25198

AQUATIC PLANTS
The ecology of irregularly flooded salt marshes of the northeastern Gulf of Mexico: A community profile
[TI86-900237] N86-25068

ARC CHAMBERS
Optical studies of electrical discharge-liquid propellant interactions
[AD-A164156] N86-24784

ARC JET ENGINES
NASA electrothermal auxiliary propulsion technology
[NASA-TM-87281] N86-24749

ARC MELTING
Synthesis and properties of elevated temperature P/M aluminum alloys
[AD-A164158] N86-24827

ARCHITECTURE
Adaptive control techniques for large space structures
[AD-A164240] N86-24742
Control circuitry for high speed VLSI (Very Large Scale Integration) winograd fourier transform processors
[AD-A164043] N86-24921
Architecture and numerical accuracy of high-speed DFT (Discrete Fourier Transform) processing systems
[AD-A163963] N86-25132

ARCHITECTURE (COMPUTERS)
A single board multiprocessor for real-time contour surface display generation
[AD-A163587] N86-25129
Development of a run time math library for the 1750A airborne microcomputer
[AD-A163905] N86-25131
Benchmark analysis of database architectures: A case study
[PB86-126687] N86-25162
Reasoning in real-time for the pilot associate: An examination of a model based approach to reasoning in real-time for artificial intelligence systems using a distributed architecture
[AD-A163947] N86-25171

ARCTIC REGIONS
Empirical and modeled synoptic cloud climatology of the Arctic Ocean
[NASA-CR-176752] N86-25078

ARGON LASERS
High resolution coherent anti-Stokes Raman spectroscopy of deuterium gas
[AD-A163946] N86-24779

ARID LANDS
Remote monitoring of processes that shape desert surfaces: The Desert Winds Project
[TI86-900108] N86-25099
ARITHMETIC
Arithmetic circuitry for high speed VLSI Winograd Fourier transform processor
[AD-A163943] N86-24917
Architecture and numerical accuracy of high-speed DFT (Discrete Fourier Transform) processing systems
[AD-A163963] N86-25132
ARITHMETIC AND LOGIC UNITS
Arithmetic circuitry for high speed VLSI Winograd Fourier transform processor
[AD-A163943] N86-24917
ARIZONA
Chemical, petrographic and K-Ar age data to accompany reconnaissance geologic strip map from Kingman to South of Bill Williams Mountain, Arizona
[DE85-014242] N86-25035
ARMED FORCES (FOREIGN)
Our wings A01
[AD-A163608] N86-24654
ARRAYS
Relative positioning of ocean bottom benchmarks AD-A164177 HC A05/MF A01
[AD-A164177] N86-24684
Control circuitry for high speed VLSI (Very Large Scale Integration) winograd fourier transform processors
[AD-A164043] N86-24921
Content-Addressable Memory manager: Design and evaluation
[AD-A164037] N86-25133
ARRIVALS
An analysis of the accessibility of Earth-approaching asteroids
[AD-A163976] N86-25313
ARTIFICIAL INTELLIGENCE
Application of artificial intelligence to improve aircraft survivability
[AD-A164172] N86-24674
Adaptive control, learning, and cost-effective sensor systems for robotics or advanced automation systems
[AD-A163615] N86-24996
Man-machine systems of the 1990 decade: Cognitive factors and human interface issues
[AD-A163865] N86-25123
An application of adaptive learning to malfunction recovery
[NASA-CR-166620] N86-25169
Education and computers: An AI (Artificial Intelligence) perspective
[AD-A163618] N86-25170
Reasoning in real-time for the pilot associate: An examination of a model based approach to reasoning in real-time for artificial intelligence systems using a distributed architecture
[AD-A163947] N86-25171
The structures of discourse structure
[AD-A163024] N86-25172
Decision procedures
[AD-A163049] N86-25173
ARTIFICIAL SATELLITES
Kalman filtering state noise adaptive estimation
[INPE-3790-PRE/885] N86-25202
ARTILLERY
Measurement of interior ballistic performance using FM/FM radio telemetry techniques
[AD-A164150] N86-24728
Introduction to kernel density estimation
[AD-A163920] N86-25206
ARTILLERY FIRE
The long-range shelling of Paris and physical chemistry problems of extremely long-range firing
[NASA-TM-88416] N86-24868
ASCENT TRAJECTORIES
Lubricant foaming and aeration study, part 2
[AD-A163696] N86-24849
ASPARTIC ACID
Multidisciplinary studies on excitatory amino acids as transmitters in the brain
[AD-A164258] N86-25115
ASSOCIATIVE PROCESSING (COMPUTERS)
Content-Addressable Memory manager: Design and evaluation
[AD-A164037] N86-25133
ASTEROID MISSIONS
An analysis of the accessibility of Earth-approaching asteroids
[AD-A163976] N86-25313
ASTEROIDS
Motion in the restricted problem of three bodies for small values of the mass parameter N86-25201
An analysis of the accessibility of Earth-approaching asteroids
[AD-A163976] N86-25313
ASTROMETRY
The analysis of near-Earth satellite astrometric data at the ETS
[AD-A163902] N86-25312
ASTRONAUTS
A proposed design for an interim space rescue ferry vehicle
[AD-A164039] N86-24741
ASTRONOMICAL CATALOGS
International Ultraviolet Explorer Atlas of O-typespectra from 1200 to 1900 angstrom
[NASA-RP-1155] N86-25307
ASTRONOMICAL MODELS
On stellar streaming motions in triaxial objects: The case of the galactic bulge N86-25308
ASTRONOMICAL TELESCOPES
The analysis of near-Earth satellite astrometric data at the ETS
[AD-A163902] N86-25312
ASTRONOMY
The great observatories for space astrophysics
[NASA-CR-176754] N86-24712
ASTROPHYSICS
The great observatories for space astrophysics
[NASA-CR-176754] N86-24712
ASYMMETRY
Experimental assessment of vortex retaining cavity flaps for maneuverability improvement on delta wing fighter aircraft
[AD-A164104] N86-24690
Vorticity production in delayed asymmetric cylindrical implosions
[DE86-004369] N86-24953
Robust estimation of the location parameter of life distributions
[AD-A163993] N86-25008
ASYMPTOTIC METHODS
Maximum likelihood recursion and stochastic approximation in sequential designs
[AD-A163628] N86-25188
ASYMPTOTIC SERIES
A test for program effect in the absence of a proper control group
[AD-A163783] N86-25204
ATLANTIC OCEAN
Forecast of Atlantic seasonal hurricane activity for 1986 N86-25080
A compilation of moored current meter and wind recorder data. Volume 38. Long-term upper ocean study (LOTUS) (Moorings 787, 788, 789, 790, 792), April 1983 - May 1984
[AD-A163897] N86-25103
ATMOSPHERIC CHEMISTRY
Geophysical Fluid Dynamics Laboratory activities FY 1985, plans FY 1986
[PB86-113545] N86-25095
ATMOSPHERIC CIRCULATION
Remote sensing of atmospheric winds by utilizing speckle-turbulence interaction and optical heterodyne detection
[AD-A164187] N86-25087
Geophysical Fluid Dynamics Laboratory activities FY 1985, plans FY 1986
[PB86-113545] N86-25095
ATMOSPHERIC COMPOSITION
Molecular absorption of atmospheric species
[AD-A164024] N86-25075
ATMOSPHERIC MODELS
Modeling transport by convective clouds for regional air pollution models
[PB86-144623] N86-25060
Atmospheric modeling: Model and accuracy
[PB86-128683] N86-25062
Molecular absorption of atmospheric species
[AD-A164024] N86-25075
Empirical and modeled synoptic cloud climatology of the Arctic Ocean
[NASA-CR-176752] N86-25078
ATMOSPHERIC PHYSICS
Description of a two-dimensional atmospheric transport model
[DAR-TP-11] N86-25055
Molecular absorption of atmospheric species
[AD-A164024] N86-25075
ATMOSPHERIC PRESSURE
Pressure based separation in the upper airspace
[CAR-8614] N86-24679
Application of an atmospheric pressure sampling mass spectrometer to chlorination reactions
[NASA-TM-87270] N86-24813
Stationary motions and incompressible limit for compressible viscous fluids
[AD-A163600] N86-24941
Evaluation of NOGAPS 2.1 (Navy Operational Global Atmospheric Prediction System 2.1) systematic error - winter 1983 - 1984
[AD-A163812] N86-25082
ATMOSPHERIC REFRACTION
Remote measurement of the atmospheric isoplanatic angle and determination of refractive turbulence profiles by direct inversion of the scintillation amplitude covariance function with Tikhonov regularization
[AD-A163629] N86-25239
ATMOSPHERIC TURBULENCE
Helicopter rotor noise due to ingestion of atmospheric turbulence
[NASA-CR-3973] N86-25216
ATOMIC ENERGY LEVELS
The axial injection TEM orbitron maser
[AD-A164166] N86-24985
ATOMIZERS
Liquid seeding atomizer
[NASA-CASE-ARC-11631-1] N86-24935
ATOMIZING
Characterization of simulated small-droplet fuel sprays
[NASA-TM-87286] N86-24961
ATOMS
Quantum mechanical atomic energy operator
[AD-A163839] N86-25226
ATTENUATORS
Shuttering efficiencies of nanosecond-gated photoemissive shutter tubes
[DE85-015728] N86-25248
ATTITUDE CONTROL
Renewing solar science: The solar maximum repair mission
[NASA-EP-206] N86-24714
Evaluation of a double Gimbal IPACS design
[NASA-CR-178040] N86-24745
AUDIO EQUIPMENT
Relative positioning of ocean bottom benchmarks AD-A164177 HC A05/MF A01
[AD-A164177] N86-24684
AURORAL ZONES
Plasma observations in the auroral and polar cap region
[AD-A163654] N86-25071
AUSTENITIC STAINLESS STEELS
Study of phase distribution in unstable austenite steel using thermoelectromotive forces
[BLL-M-36644-(5828.4)] N86-24811
AUTOCORRELATION
Higher order residual analysis for nonlinear time series with autoregressive correlation structures
[AD-A163611] N86-25185
Effects of convergence zone multipath on crosscorrelation
[AD-A163650] N86-25221
AUTOIONIZATION
Studies of autoionizing states relevant to dielctronic recombination
[DE86-002908] N86-25264
AUTOMATIC CONTROL
The science of and advanced technology for cost-effective manufacture of high precision engineering products. Volume 4. Thermal effects on the accuracy of numerically controlled machine tool
[AD-A163598] N86-24871
Orientation of circular connectors using vision processing
[AD-D012153] N86-24918
Adaptive control, learning, and cost-effective sensor systems for robotics or advanced automation systems
[AD-A163615] N86-24996
AUTOMATIC TEST EQUIPMENT
Ground Software Maintenance Facility (GSMF) user's manual. Appendices NASA-CR-178806 NAS 1.26:178806 Rept-41849-G159-026-App HC A05/MF A01
[NASA-CR-178806] N86-25144
AUTOMOBILE ENGINES
Emissions from a light-duty diesel: Ambient temperature and fuel effects
[PB86-131349] N86-24865
Stirling Powered Van Progam overview
[NASA-TM-87227] N86-25303
AUTONOMOUS NAVIGATION
A robot vision system
[AD-A164202] N86-24999
AUTONOMY
Gyro and accelerometer based navigation system for a mobile autonomous robot
[AD-A164036] N86-24682
AVERAGE
Propulsion and Energetics Panel Working Group 14 on suitable averaging techniques in non-uniform internal flows
[AD-A133968] N86-24692

AVIONICS
Reliability of navigation service provided by the global positioning system
[AD-A163541] N86-24680
An engineering approach to the use of expert systems technology in avionics applications
[NASA-TM-88263] N86-24687
Using Ada in the real-time avionics environment Issues and conclusions
[AD-A163844] N86-25151
AGARD Bulletin: Meetings, publications, membership
[AGARD-BULL-86/1] N86-25285
Cost estimating relationships for fixed wing aircraft: List price versus empty weight
[AD-A164196] N86-25300

AXIAL FLOW
Two-dimensional confined jet thrust vector control with flow visualization and variable flow geometry
[AD-A164214] N86-24699
Laser beam duct pressure controller system
[AD-D012017] N86-24984

AXIAL STRAIN
Damage models for delamination and transverse fracture in fibrous composites
[AD-A164164] N86-24765

AXISYMMETRIC BODIES
Experimental study of the supersonic turbulent boundary layer on a blunted axisymmetric body
[AD-A163736] N86-24669
The detumbling of an axially symmetric satellite with an orbital maneuvering vehicle by nonlinear feedback control
[AD-A163989] N86-24717

AXISYMMETRIC FLOW
The detumbling of an axially symmetric satellite with an orbital maneuvering vehicle by nonlinear feedback control
[AD-A163939] N86-24717

AZIMUTH
Computed centerline MLS (Microwave Landing System) approach demonstration at Washington National Airport
[AD-A163722] N86-24681

B

BACKGROUND NOISE
On detection of number of signals in presence of white noise
[AD-A164211] N86-24927

BACKGROUND RADIATION
Infrared background and target measurement HC A05/MF A01
[AD-A163567] N86-25238

BACKSCATTERING
Investigation of breadboard temperature profiling system for SSME fuel preburner diagnostics
[NASA-CR-178799] N86-24957
Studies related to ocean dynamics. Task 3.2: Aircraft Field Test Program to investigate the ability of remote sensing methods to measure current/wind-wave interactions
[NASA-CR-168349] N86-25100
Phase-insensitive detection and the method of moments for ultrasonic tissue characterization N86-25223
Laser interaction in long-scalelength plasmas
[AD-A163604] N86-25262

BACKUPS
A proposed design for an interim space rescue ferry vehicle
[AD-A164039] N86-24741

BALL BEARINGS
Review and critical analysis: Rolling-element bearings for system life and reliability
[NASA-CR-174710] N86-24991

BALLISTICS
Laser-photodetector timing station instruction and maintenance manual
[NASA-CR-178835] N86-24720
Measurement of interior ballistic performance using FM/FM radio telemetry techniques
[AD-A164150] N86-24728
Detection and location of ballistic damage in composite materials using acoustic emission methods
[AD-A164183] N86-24766

BALLOON-BORNE INSTRUMENTS
Gamma-ray background induced in a double Ge(Li) spectrometer at balloon altitudes in the hemisphere
[INPE-3797-PRE/892] N86-25317
Abundances and energy spectra of high energy heavy cosmic-ray nuclei N86-25319

BANACH SPACE
A convergence theorem for Newton's method in Banach spaces
[AD-A163625] N86-25209

BANDPASS FILTERS
Research on devices for integrated millimeter wave systems
[AD-A163903] N86-24916
Low pass filters with linear phase
[AD-A163984] N86-24920

BANDWIDTH
Routing of high data rate signals using degenerate four wave mixing in BSO
[AD-A163746] N86-25240
Far infrared heterodyne detection with gallium doped germanium photoconductors
[AD-A163879] N86-25242

BARIUM ION CLOUDS
A plasma wave instrument on the AMPTE/IRM (Active Magnetospheric Particle Tracing Explorers/Ion Release Module) spacecraft
[AD-A163048] N86-25074

BARRIER LAYERS
Study and analysis of AlGaAs/GaA modulation doped field-effect transistors incorporating p-type Schottky gate barriers
[AD-A164103] N86-24922
Method of measuring field funneling and range straggling in semiconductor charge-collecting junctions
[NASA-CASE-NPO-16584-1-CU] N86-25269

BASE FLOW
Numerical flow field calculations for a missile configuration at M = .6
[AD-A164155] N86-24951

BAYES THEOREM
Estimation of ICBM (intercontinental ballistic missile) performance parameters
[AD-A164021] N86-24725
Characteristics of Bayesian multiple model adaptive estimation for tracking airborne targets
[AD-A163830] N86-24890

BAYS (STRUCTURAL UNITS)
Deployable geodesic truss structure A01
[NASA-CASE-LAR-13113-1] N86-24867

BAYS (TOPOGRAPHIC FEATURES)
On stratification and wind-induced mixing in the Chesapeake Bay N86-25107

BEACONS
Relative positioning of ocean bottom benchmarks AD-A164177 HC A05/MF A01
[AD-A164177] N86-24684

BEADS
Effect of forced convection heat transfer on weld pools
[AD-A163970] N86-24998

BEAM INJECTION
The axial injection TEM orbitron maser
[AD-A164166] N86-24985

BEAMS (RADIATION)
Effectiveness of laser treatment of materials by scanning beam
[BLL-M-36690-(5828.4)] N86-24793
Routing of high data rate signals using degenerate four wave mixing in BSO
[AD-A163746] N86-25240

BEAMS (SUPPORTS)
Structural optimization by generalized, multilevel decomposition
[NASA-TM-87605] N86-24686
The effect of energy dissipation due to friction at the joint of a simple beam structure
[AD-A163975] N86-24739
Wave attenuation in periodic structures N86-24873
Numerical approximation for the infinite-dimensional discrete-time optimal linear-quadratic regulator problem
[NASA-CR-178081] N86-25176

BEARINGS
Passive eddy-current damping as a means of vibration control in cryogenic turbomachinery
[NASA-TP-2562] N86-24722

BENDING MOMENTS
Behaviour of dynamically loaded pipes with circumferential flaws under internal pressure and external bending loads
[BLL-RISLEY-TR-5278-(9091.9F)] N86-25010

BERING SEA
Outer Continental Shelf Enviromental Assessment Program: Reports of principal investigators, volume 30
[PB86-134756] N86-25063
Outer Continental Shelf Environmental Assessment Program: Reports of principal investigators, volume 31
[PB86-134764] N86-25064

BERNSTEIN ENERGY PRINCIPLE
Advanced ICRF antenna design for R-TOKAMAK
[IPPJ-759] N86-25249

BIAS
Bias and efficiency of the consistent weighted regression estimators in finite population sampling HC A03/MF A01
[AD-A163601] N86-25203

BIBLIOGRAPHIES
Aeronautical Engineering: A continuing bibliography with indexes (supplement 199)
[NASA-SP-7037(199)] N86-24653
Space Station Systems: A bibliography with indexes (supplement 1)
[NASA-SP-7056(01)] N86-24711
Technology for large space systems: A bibliography with indexes
[NASA-SP-7046(13)] N86-24713
Microwave tube collectors. Collector systems of UHF devices with longitudinal interactions
[NASA-TM-88399] N86-24910
Metrology for electromagnetic technology: A bibliography of NBS (National Bureau of Standards) publications
[PB86-130234] N86-24975
Earth resources: A continuing bibliography with indexes (issue 49)
[NASA-SP-7041(49)] N86-25033
Earth science investigations in the United States Antarctic Research Program (USARP) for the period July 1, 1984 - June 30, 1985
[PB86-143773] N86-25076
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 284)
[NASA-SP-7011(284)] N86-25111

BINARY ALLOYS
Enthalpies of mixing of alkaline-earth metals with iron and nickel
[BLLD-5828.4-M-36625] N86-24806
Accurate sturcture factor determination of binary cubic solid solutions
[DE86-002891] N86-24832

BINARY SYSTEMS (MATERIALS)
The thallium monoborate-boric acid anhydride binary system
[NASA-TM-88393] N86-24770

BINDERS (MATERIALS)
Binders for compacting nitride type ceramics
[NASA-TM-88397] N86-24844
A method for fabricating magnetodielectric cores
[AD-A163457] N86-24911
Advanced artificial dielectric materials for millimeter wavelength applications. Part A
[AD-A164195] N86-24925

BIOCHEMISTRY
Chemically induced damage to the hippocampal formation
[NDRE/PUBL-86/1002] N86-25112

BIODEGRADATION
Fungi and hydrocarbons in the marine environment
[PB86-109964] N86-25066

BIOLOGICAL EFFECTS
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 284)
[NASA-SP-7011(284)] N86-25111

BIOMASS
Biomass economy
[AD-A163647] N86-25048

BIOMASS ENERGY PRODUCTION
Biomass economy
[AD-A163647] N86-25048

BIRDS
Outer Continental Shelf Enviromental Assessment Program: Reports of principal investigators, volume 30
[PB86-134756] N86-25063

BIVARIATE ANALYSIS
Nonparametric and parametric estimation of wave statistics and spectra
[PB86-141967] N86-25105

BLADE TIPS
One-piece HPTR blade squealer tip
[AD-D012003] N86-24698
Ramp-integration technique for capacitance-type blade-tip clearance measurement
[NASA-TM-87241] N86-24964

BLINDS
Shuttering efficiencies of nanosecond-gated photoemissive shutter tubes
[DE85-015728] N86-25248

BLOWOUTS
Altitude ignition/lean decel study
[AD-A163052] N86-24781

BLUNT BODIES
Experimental study of the supersonic turbulent boundary layer on a blunted axisymmetric body
[AD-A163736] N86-24669

BODY COMPOSITION (BIOLOGY)
Physical, anthropometrical, and body composition characteristics of workers at Kennedy Space Center
[NASA-TM-83102] N86-25122

BODY-WING CONFIGURATIONS
Unsteady transonic flow calculations for wing-fuselage configurations
[NASA-TM-87707] N86-24657

Experimental study of apex fences for lift enhancement on a highly swept delta wing configuration
[AD-A163877] N86-24705

BOILERS
Chemical Thermodynamics in Steam Power Cycles Data Requirements
[PB86-130937] N86-24787

BOLTZMANN DISTRIBUTION
Thermal barrier potential of a tandem mirror
[IPPJ-768] N86-25259

BOOSTER ROCKET ENGINES
Feasibility study and verified design concept for new improved hot gas facility
[NASA-CR-178628] N86-24719

BORIDES
Influence on wear of translational velocity of specimens during laser borizing of steel
[BLL-M-36646-(5828.4)] N86-24809

BORON ALLOYS
Positron annihilation studies of very fine structured materials
[AD-A163822] N86-25225

BORON NITRIDES
Auger electron spectroscopy, secondary ion mass spectroscopy and optical characterization of a-C-H and BN films
[NASA-TM-87258] N86-25268

BORON OXIDES
The thallium monoborate-boric acid anhydride binary system
[NASA-TM-88393] N86-24770

BOROSILICATE GLASS
Interparticle interference during light scattering by submicroinhomogeneous glass
[NASA-TM-88407] N86-24843

BOUNDARIES
Parallel processing of region boundaries
[AD-A164112] N86-25157

BOUNDARY LAYER EQUATIONS
Unsteady solution of the boundary layer equations with application to space shuttle tiles
[AD-A164105] N86-24727

BOUNDARY LAYER FLOW
Contributions to the understanding of large-scale coherent structures in developing free turbulent shear flows
[NASA-CR-176772] N86-24932

BOUNDARY LAYER SEPARATION
Experimental study of the supersonic turbulent boundary layer on a blunted axisymmetric body
[AD-A163736] N86-24669
Two-dimensional confined jet thrust vector control with flow visualization and variable flow geometry
[AD-A164214] N86-24699
Separated flows
[AD-A163551] N86-24939
Structure and mixing in turbulent shear flows
[AD-A163584] N86-24940
Effects of surface roughness on pressure distribution and boundary layer over compressor blades at high Reynolds number in a two-dimensional cascade
[AD-A163974] N86-24946
Numerical flow field calculations for a missile configuration at M = .6
[AD-A164155] N86-24951
Technical notes on orifice tests
[AD-A164227] N86-24952

BOUNDARY LAYER TRANSITION
An experimental investigation on location of boundary layer transition on the NACA 0012 using surface hot film gages
[NASA-TM-88285] N86-24936
Effects of surface roughness on pressure distribution and boundary layer over compressor blades at high Reynolds number in a two-dimensional cascade
[AD-A163974] N86-24946
Flat plate and turbine vane cascade heat transfer investigation using a shock tube
[AD-A163992] N86-24947

BOUNDARY LAYERS
Natural laminar flow flight experiments on a swept wing business jet-boundary layer stability analyses
[NASA-CR-3975] N86-24659
R4 airfoil data corrected for sidewall boundary-layer effects in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TP-2565] N86-24662
Three dimensional finite element analysis of failure in composite laminates N86-24768
Criteria for significance of simultaneous presence of both condensible vapors and aerosol particles on mass transfer (deposition) rates
[NASA-TM-87247] N86-24869

BOUNDARY VALUE PROBLEMS
A model for oxygen atom recombination on a silicon dioxide surface
[AD-A163990] N86-24782
Comparison of absorption and radiation boundary conditions using a time-domain three-dimensional finite difference electromagnetic computer code
[AD-A163828] N86-25149
On the two-phase Stefan problem with interfacial energy and entropy
[AD-A163715] N86-25211

BRAILLE
Braille reading system
[NASA-CASE-LAR-13306-1] N86-25292

BRAIN
Multidisciplinary studies on excitatory amino acids as transmitters in the brain
[AD-A164258] N86-25115

BRAKES (FOR ARRESTING MOTION)
Fireproof hydraulic brake system
[AD-A163542] N86-24688

BRANCHING (MATHEMATICS)
Connecting mathematics, science and high technology: Research on solutions to nonlinear partial differential equations, bifurcation phenomena, and constructive methods for implementing the calculus of variations for relevant, physical problems
[AD-A162827] N86-25197

BRAZING
Joining of ceramics for advanced heavy-duty diesels
[NASA-CR-175019] N86-24846

BROADCASTING
Satellite voice broadcast. Volume 1: Executive summary
[NASA-CR-175016] N86-24875
Satellite voice broadcast. Volume 2: System study
[NASA-CR-175017] N86-24876
Satellite voice broadcast system study, volume 2
[NASA-CR-174905] N86-24877
Satellite voice broadcase system study. Volume 1: Executive summary
[NASA-CR-174904] N86-24878

BROMIDES
Laser probing and modification of MOCVD and VPE reactor kinetics
[AD-A163860] N86-24981

BUBBLES
ALESEP. Part 2: A computer program for the analysis of leading edge separation bubbles on infinite swept wings
[NASA-CR-178015] N86-24664
Lubricant foaming and aeration study, part 2
[AD-A163696] N86-24849

BUCKLING
The buckling of composite cylindrical panels considering environmental effects
[AD-A163878] N86-25024

BUFFER STORAGE
Interactive communication channel
[AD-D011968] N86-24893
Total temperature probe buffer amplifier
[AD-D011967] N86-24969
Braille reading system
[NASA-CASE-LAR-13306-1] N86-25292

BURNING RATE
CARS (Coherent Anti-Stokes Raman Scattering) spectroscopy of the reaction zone of methane-nitrous oxide and RDX propellant flames
[AD-A163465] N86-24773
ACTA Armamentarii (selected articles)
[AD-A163713] N86-24861
A dimensional analysis approach for characterizing pryotechnic mixture systems
[AD-A163018] N86-24863

BUTENES
Vibrational energy transfer at a liquid gallium surface. Activation of unimolecular cyclobutene isomerization
[AD-A163023] N86-25230

C

CALCIUM
Chemically induced damage to the hippocampal formation
[NDRE/PUBL-86/1002] N86-25112

CALCIUM OXIDES
Influence of lime additions on silicothermic reduction of titanium
[BLLD-5828.4-M-36638] N86-24803

CALCULUS OF VARIATIONS
Connecting mathematics, science and high technology: Research on solutions to nonlinear partial differential equations, bifurcation phenomena, and constructive methods for implementing the calculus of variations for relevant, physical problems
[AD-A162827] N86-25197

CALIBRATING
Radiometric calibration procedures using the NBS (National Bureau of Standards) MARBLE electronics package
[PB86-129756] N86-24721
Calibration of test systems for measuring power losses of transformers
[PB86-132032] N86-24928
Reciprocity calibration in a plane wave resonator
[AD-A164149] N86-24972

CALIFORNIA
Los Angeles, California tornado of March 1, 1983
[PB86-141991] N86-25089

CAMERA SHUTTERS
A gated microchannel plate image intensifier packaged in a reflex camera back
[AD-A163015] N86-24970

CAMERAS
Orientation of circular connectors using vision processing
[AD-D012153] N86-24918
Hall station and camera system operation and maintenance manual
[NASA-CR-178836] N86-24966
Aerial camera research: Accuracy comparison using the ZEISS RMK 15/23 and the JENA LMK aerial cameras
[PB86-126836] N86-24973

CANARD CONFIGURATIONS
Multivariable control law design for enhanced air combat maneuvering. F-15/STOL (Short Take-Off and Landing) derivative fighter
[AD-A164017] N86-24706

CANTILEVER BEAMS
The effect of energy dissipation due to friction at the joint of a simple beam structure
[AD-A163975] N86-24739

CANTILEVER MEMBERS
Wave attenuation in periodic structures N86-24873

CAPACITANCE SWITCHES
Ramp-integration technique for capacitance-type blade-tip clearance measurement
[NASA-TM-87241] N86-24964

CAPACITORS
Ice detector
[NASA-CASE-LAR-13403-1] N86-24673

CAPILLARY FLOW
Evaluation of capillary reinforced composites
[NASA-CR-175061] N86-24760
Measurement of viscosity of gaseous mixtures at atmospheric pressure
[NASA-TP-2582] N86-24962

CAPILLARY TUBES
Lubricant foaming and aeration study, part 2
[AD-A163696] N86-24849

CAPILLARY WAVES
Studies related to ocean dynamics. Task 3.2: Aircraft Field Test Program to investigate the ability of remote sensing methods to measure current/wind-wave interactions
[NASA-CR-168349] N86-25100

CARBON
Auger electron spectroscopy, secondary ion mass spectroscopy and optical characterization of a-C-H and BN films
[NASA-TM-87258] N86-25268

CARBON CYCLE
The ecology of irregularly flooded salt marshes of the northeastern Gulf of Mexico: A community profile
[TI86-900237] N86-25068

CARBON DIOXIDE
Description of a two-dimensional atmospheric transport model
[DAR-TP-11] N86-25055

CARBON DIOXIDE LASERS
Laser thermal propulsion
[AD-A164163] N86-24753
Effectiveness of laser treatment of materials by scanning beam
[BLL-M-36690-(5828.4)] N86-24793
Pseudo-color display of laser radar imagery
[AD-A164213] N86-25246

CARBON FIBERS
Damping characteristics of metal matrix composites
[AD-A163569] N86-24762

CARBON MONOXIDE
Molecular outflows and mass loss in pre-main-sequence stars N86-25309

CARBON TETRACHLORIDE
Deposition of chromium carbides on steel in atmosphere of carbon tetrachloride
[BLL-M-36693-(5828.4)] N86-24795
CARBON-CARBON COMPOSITES
Stress-strain behavior and failure uniaxial composites in combined compression and shear-2
[AD-A163477] N86-25020
CARBONYL COMPOUNDS
Metal cluster topology. Part 3: Platinum carbonyl clusters
[AD-A164241] N86-24830
CARBOXYL GROUP
Method for making heterocyclic block copolymer
[AD-D011971] N86-24853
CARBOXYLIC ACIDS
Method for making heterocyclic block copolymer
[AD-D011971] N86-24853
CARRIER TRANSPORT (SOLID STATE)
Theoretical and material studies on thin-film electroluminescent devices
[NASA-CR-176710] N86-24905
CARTESIAN COORDINATES
Kalman filter design for the long range intercept function of the F-4E/G fire control system
[AD-A164205] N86-24926
Adaptive-grid optimization for minimizing steady-state, truncation error
[AD-A164038] N86-24948
POSSOL: Poisson equation solver
[DE86-002292] N86-25160
Numerical grid generation for parabolic partial differential equations using marching techniques
[AD-A164020] N86-25198
CASCADE FLOW
Flat plate and turbine vane cascade heat transfer investigation using a shock tube
[AD-A163992] N86-24947
CAST ALLOYS
Melting of solid solution during crystallization of alloy white cast iron
[BLL-M-36677-(5828.4)] N86-24796
Constant-Load-Amplitude fatigue crack growth testing of cast aluminum alloys A201-T7 and A357-T6
[AD-A163494] N86-24821
CASTINGS
One-piece HPTR blade squealer tip
[AD-D012003] N86-24698
CATALYSIS
Catalysis of hydrolysis reactions by platinum and nickel phosphine complexes
[AD-A163666] N86-24775
A model for oxygen atom recombination on a silicon dioxide surface
[AD-A163990] N86-24782
Protected ethynlated phenols
[AD-D012019] N86-24854
Overlayer-induced enhanced oxidation of GaAs surfaces
[AD-A163450] N86-25270
CATHODES
Studies on radiative collisional and ultraviolet lasers
[AD-A163901] N86-24982
CAUCHY PROBLEM
A comparison of estimation techniques for the two parameter Cauchy distribution
[AD-A163833] N86-25205
A modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises test for the Cauchy distribution with unknown location and scale parameters
[AD-A164204] N86-25208
CAVITIES
Experimental assessment of vortex retaining cavity flaps for maneuverability improvement on delta wing fighter aircraft
[AD-A164104] N86-24690
CAVITY RESONATORS
Reciprocity calibration in a plane wave resonator
[AD-A164149] N86-24972
Reverse-wave suppressor mirror effects on CW HF unstable ring laser performance
[AD-A163529] N86-24979
CELESTIAL MECHANICS
The analysis of near-Earth satellite astrometric data at the ETS
[AD-A163902] N86-25312
B and V photoelectric photometry and light curve solution of the interacting binary systems Hi Puppis,BI Eridani and Sy Horologii N86-25314
CENTRAL NERVOUS SYSTEM
Chemically induced damage to the hippocampal formation
[NDRE/PUBL-86/1002] N86-25112
Multidisciplinary studies on excitatory amino acids as transmitters in the brain
[AD-A164258] N86-25115
CENTRAL PROCESSING UNITS
Control circuitry for high speed VLSI (Very Large Scale Integration) winograd fourier transform processors
[AD-A164043] N86-24921
CERAMIC COATINGS
Improved piston ring materials for 650 deg C service
[NASA-CR-175058] N86-24845
CERAMIC FIBERS
Tailoring multiphase ceramics
[AD-A164010] N86-24855
CERAMIC MATRIX COMPOSITES
Tailoring multiphase ceramics
[AD-A164010] N86-24855
CERAMICS
Adequacy of surface analytical tools for studying the tribology of ceramics
[NASA-TM-87308] N86-24837
Manufacture of ceramic sinters
[NASA-TM-88398] N86-24842
Binders for compacting nitride type ceramics
[NASA-TM-88397] N86-24844
Joining of ceramics for advanced heavy-duty diesels
[NASA-CR-175019] N86-24846
Hot gas corrosion of silicon based ceramics
[AD-A163810] N86-24850
Tailoring multiphase ceramics
[AD-A164010] N86-24855
CERIUM
Impurity diffusion in NiO grain boundaries
[AERE-R-11763] N86-25280
CHAFF
Simulation of chaff cloud signature
[AD-A164106] N86-24898
Optimal estimation of target in clutter (CHAFF) from radar
[AD-A164200] N86-24901
Spectral characteristics of radar echoes from aircraft-dispensed chaff N86-24904
CHALLENGER (ORBITER)
Report of the Presidential Commission on the Space Shuttle Challenger Accident, volume 1 N86-24726
CHANNEL CAPACITY
An adaptive collision resolution protocol for random accessed channels
[AD-A164169] N86-25165
CHAOS
Chaos in laser-matter interactions N86-24989
CHAPMAN-ENSKOG THEORY
Measurement of viscosity of gaseous mixtures at atmospheric pressure
[NASA-TP-2582] N86-24962
CHARGE COUPLED DEVICES
Analysis of contrast sensitivity and spectral response of imaging systems
[AD-A164228] N86-25247
CHARGE INJECTION DEVICES
Analysis of contrast sensitivity and spectral response of imaging systems
[AD-A164228] N86-25247
CHARGE TRANSFER
Analysis of contrast sensitivity and spectral response of imaging systems
[AD-A164228] N86-25247
CHARGED PARTICLES
Numerical solutions of selected problems which arise in the theory of particle beams
[AD-A164041] N86-25235
CHEMICAL BONDS
Determination of initial chemical steps in the gas-phase decomposition of energetic molecules
[AD-A163751] N86-24777
Metal cluster topology. Part 3: Platinum carbonyl clusters
[AD-A164241] N86-24830
CHEMICAL COMPOSITION
Using REM oxides to modify steel
[BLL-M-36639-(5828.4)] N86-24791
Low-solvent primer and finish coats for use on steel structures
[PB86-139326] N86-24834
Particle size reduction of Si3N4 with Si3N4 milling hardware
[NASA-TM-86864-REV] N86-24839
CHEMICAL ENERGY
Competing unimolecular reactions of flame radicals. Part 1: Isomerization and dissociation of the methoxy radical
[AD-A164154] N86-24783
CHEMICAL EQUILIBRIUM
Conductimetric determination of decomposition of silicate melts
[NASA-TM-86394] N86-24769
A characterization of the chemical vapor deposition of gallium arsenide and indium phosphide in the hydride and chloride systems
[AD-A164259] N86-25279
CHEMICAL PROPERTIES
Energy and chemical change
[AD-A164147] N86-25231
Properties of organic superconductors
[AD-A163573] N86-25274
CHEMICAL REACTIONS
Mechanisms of combustion of hydrocarbon/alcohol fuel blends
[AD-A163737] N86-24776
Introduction to free atoms and particles
[AD-A163586] N86-25224
Energy and chemical change
[AD-A164147] N86-25231
Overlayer-induced enhanced oxidation of GaAs surfaces
[AD-A163450] N86-25270
A characterization of the chemical vapor deposition of gallium arsenide and indium phosphide in the hydride and chloride systems
[AD-A164259] N86-25279
CHEMILUMINESCENCE
A preliminary study of ester oxidation on an aluminum surface using chemiluminescence
[NASA-TM-87242] N86-24835
CHESAPEAKE BAY (US)
On stratification and wind-induced mixing in the Chesapeake Bay N86-25107
CHILDREN
Education and computers: An AI (Artificial Intelligence) perspective
[AD-A163618] N86-25170
CHIPS
A microcomputer-based menu-driven chip layout language
[AD-A164109] N86-24923
CHIPS (ELECTRONICS)
Algorithm definition for the VLSI design implementation of the electromagnetic radiation integral
[AD-A163825] N86-24888
Control circuitry for high speed VLSI (Very Large Scale Integration) winograd fourier transform processors
[AD-A164043] N86-24921
Image segmentation using the military specification 1750A
[AD-A164180] N86-25138
CHIPS (MEMORY DEVICES)
Content-Addressable Memory manager: Design and evaluation
[AD-A164037] N86-25133
CHLORIDES
A characterization of the chemical vapor deposition of gallium arsenide and indium phosphide in the hydride and chloride systems
[AD-A164259] N86-25279
CHLORINATION
Application of an atmospheric pressure sampling mass spectrometer to chlorination reactions
[NASA-TM-87270] N86-24813
CHROMIUM
Impurity diffusion in NiO grain boundaries
[AERE-R-11763] N86-25280
CHROMIUM ALLOYS
Magnetic susceptibility of Fe-Cr-O alloys
[BLL-M-36643-(5828.4)] N86-24812
CHROMIUM CARBIDES
Deposition of chromium carbides on steel in atmosphere of carbon tetrachloride
[BLL-M-36693-(5828.4)] N86-24795
CHRONOLOGY
Chemical, petrographic and K-Ar age data to accompany reconnaissance geologic strip map from Kingman to South of Bill Williams Mountain, Arizona
[DE85-014242] N86-25035
CHUCKCHI SEA
Outer Continental Shelf Enviromental Assessment Program: Reports of principal investigators, volume 30
[PB86-134756] N86-25063
CIRCLES (GEOMETRY)
Examination of the Circle Spline routine
[DE86-004361] N86-25161
A proof of Grace's theorem by induction
[AD-A163714] N86-25191
CIRCUIT DIAGRAMS
Gyro and accelerometer based navigation system for a mobile autonomous robot
[AD-A164036] N86-24682
CIRCUITS
Circuits and exchange parameters at the C2 interface in the case of sequential input-output of discrete information
[AD-A163688] N86-24884
A microcomputer-based menu-driven chip layout language
[AD-A164109] N86-24923
Total temperature probe buffer amplifier
[AD-D011967] N86-24969

CIRRUS CLOUDS
Satellite cloud and precipitation analysis using a minicomputer
[AD-A163821] N86-25084
CIVIL AVIATION
Evaluation of propfan propulsion applied to general aviation
[NASA-CR-175020] N86-24895
Leadership on the flight deck: The influence of crew social relations and crew member experience on leadership style effectiveness in civil aviation flight crews
[CAR-8612] N86-25286
CLASSIFICATIONS
A theory for classified quantities
[INPE-3788-PRE/883] N86-25178
CLASSIFIERS
Ducks Unlimited Joint Research Project
[NASA-TM-88755] N86-25032
CLEARANCES
Ramp-integration technique for capacitance-type blade-tip clearance measurement
[NASA-TM-87241] N86-24964
CLEAVAGE
Protected ethyniated phenols
[AD-D012019] N86-24854
CLIMATE
Geophysical Fluid Dynamics Laboratory activities FY 1985, plans FY 1986
[PB86-113545] N86-25095
Climate sensitivity of a numerical model of ice-sheet dynamics and thermodynamics
[PB86-119617] N86-25096
CLIMATOLOGY
Diagnostic study of atmosphere-terrain interaction leading to the formation of dust clouds and poor visibilities over the near east desert areas
[AD-A163890] N86-25085
Geophysical Fluid Dynamics Laboratory activities FY 1985, plans FY 1986
[PB86-113545] N86-25095
CLOCKS
Control circuitry for high speed VLSI (Very Large Scale Integration) winograd fourier transform processors
[AD-A164043] N86-24921
CLOSED CYCLES
Radiation augmented propulsion feasibility
[AD-A163983] N86-24752
CLOSURES
One-piece HPTR blade squealer tip
[AD-D012003] N86-24698
An improved closure of the Born-Green-Yvon equation for the electric double layer
[AD-A163452] N86-24772
CLOUD COVER
Empirical and modeled synoptic cloud climatology of the Arctic Ocean
[NASA-CR-176752] N86-25078
Satellite cloud and precipitation analysis using a minicomputer
[AD-A163821] N86-25084
CLOUD PHYSICS
An assessment of data quality and quantity from airborne cloud physics projects from 1974 through 1984
[DOT/FAA/CT-85/37] N86-25079
The behavior of cloud droplets in an acoustic field: A numerical investigation
[AD-A163704] N86-25081
CLOUDS
Simulation of chaff cloud signature
[AD-A164106] N86-24898
CLOUDS (METEOROLOGY)
An assessment of data quality and quantity from airborne cloud physics projects from 1974 through 1984
[DOT/FAA/CT-85/37] N86-25079
The behavior of cloud droplets in an acoustic field: A numerical investigation
[AD-A163704] N86-25081
CLUMPS
Metal cluster topology. Part 3: Platinum carbonyl clusters
[AD-A164241] N86-24830
Exploratory projection pursuit
[AD-A163019] N86-25207
Isolation and characterization of an organogallium-arsenic cluster: Crystal structure of ((PhAsH)(R2Ga)(PhAs)6(RGa)4)(R=Me3SiCH2)
[AD-A163485] N86-25271
CLUTTER
Method and apparatus for measuring distance
[NASA-CASE-MSC-20912-1] N86-24879
Airborne bistatic radar limitations and sample calculations
[AD-A163941] N86-24892
CMOS
Microprocessor controller with nonvolatile memory implementation
[AD-A164152] N86-25136
COASTS
Physical oceanographic data marginal ice zone experiment R/V POLAR QUEEN, June-July 1984
[AD-A163591] N86-25101
COATINGS
Improved piston ring materials for 650 deg C service
[NASA-CR-175058] N86-24845
Crack healing in polymers
[AD-A164130] N86-24856
Non-destructive laser holographic testing of solid propellant for unbonding defects
[AD-A163694] N86-24860
COBALT ALLOYS
The thermodynamic particulars of amorphous cobalt alloys
[BLLD-5828.4-M-36658] N86-24797
Corrosion of nickel and cobalt base alloys in sulfate melts at 750 deg C
[NASA-CR-175111] N86-24817
COCKPITS
Frameless transparencies for aircraft cockpit enclosures
[AD-D012155] N86-24689
CODERS
Gyro and accelerometer based navigation system for a mobile autonomous robot
[AD-A164036] N86-24682
CODING
Mode S data link phase coding
[AD-A163745] N86-24886
Adaptive-grid optimization for minimizing steady-state, truncation error
[AD-A164038] N86-24948
Experiments with digitally mastered LaserVision optical discs
[BBC-RD-1986/1] N86-24976
Aerosol behavior modeling. Task 3: Support services for research and evaluation of severe accident phenomena and mitigation
[TI86-900242] N86-25067
Knowledge-based transformational synthesis of efficient structures for concurrent computation
[AD-A164022] N86-25155
Examination of the Circle Spline routine
[DE86-004361] N86-25161
COEFFICIENT OF FRICTION
Fireproof hydraulic brake system
[AD-A163542] N86-24688
COEFFICIENTS
Measurement of viscosity of gaseous mixtures at atmospheric pressure
[NASA-TP-2582] N86-24962
COGNITION
Man-machine systems of the 1990 decade: Cognitive factors and human interface issues
[AD-A163865] N86-25123
Education and computers: An AI (Artificial Intelligence) perspective
[AD-A163618] N86-25170
COHERENCE COEFFICIENT
High resolution coherent anti-Stokes Raman spectroscopy of deuterium gas
[AD-A163946] N86-24779
COHERENT RADAR
NCTR using a polarization-agile coherent radar system
[AD-A163528] N86-24882
COHERENT SCATTERING
CARS (Coherent Anti-Stokes Raman Scattering) spectroscopy of the reaction zone of methane-nitrous oxide and RDX propellant flames
[AD-A163465] N86-24773
COHESION
Behavioral considerations for space station design
[AD-A163478] N86-25118
COLD FLOW TESTS
An experimental study of clustered nozzles with variable shrouds
[AD-A163961] N86-24945
COLD PLASMAS
A solidary wave of a relativistic magnetosonic wave propagating perpendicularly to a magnetic field
[IPPJ-767] N86-25260
COLLISION AVOIDANCE
A study of a collision avoidance system mounted on a curved ground plane
[NASA-CR-176771] N86-24677
COLLISIONS
Studies on radiative collisional and ultraviolet lasers
[AD-A163901] N86-24982
An adaptive collision resolution protocol for random accessed channels
[AD-A164169] N86-25165
COLOR
An evaluation of color sets for CRT displays
[AD-A163894] N86-25125
Pseudo-color display of laser radar imagery
[AD-A164213] N86-25246
COLOR PHOTOGRAPHY
Aerial camera research: Accuracy comparison using the ZEISS RMK 15/23 and the JENA LMK aerial cameras
[PB86-126836] N86-24973
COLOR TELEVISION
Colour encoding and decoding techniques for line-locked sampled PAL and NTSC television signals
[BBC-RD-1986/2] N86-24874
COLOR VISION
An evaluation of color sets for CRT displays
[AD-A163894] N86-25125
COMBAT
Our wings A01
[AD-A163608] N86-24654
Preliminary kalman filter design to improve air combat maneuvering target estimation for the F-4E/G fire control system
[AD-A164034] N86-25200
COMBINED CYCLE POWER GENERATION
Chemical Thermodynamics in Steam Power Cycles Data Requirements
[PB86-130937] N86-24787
COMBUSTION
Non-perturbing beam deflection system and method for high repetition rate temperature measurement of combustion flames
[AD-D012154] N86-24780
Optical studies of electrical discharge-liquid propellant interactions
[AD-A164156] N86-24784
Journal of Research of the National Bureau of Standards, volume 90, number 4, July-August 1985
[PB86-137627] N86-24786
Data sources for parameters used in predictive modeling of fire growth and smoke spread
[PB86-130986] N86-24788
COMBUSTION CHAMBERS
Altitude ignition/lean decel study
[AD-A163052] N86-24781
Radical fluorescence studies with liquid propellants
[AD-A163472] N86-24857
Characterization of simulated small-droplet fuel sprays
[NASA-TM-87286] N86-24961
COMBUSTION TEMPERATURE
CARS (Coherent Anti-Stokes Raman Scattering) spectroscopy of the reaction zone of methane-nitrous oxide and RDX propellant flames
[AD-A163465] N86-24773
Non-perturbing beam deflection system and method for high repetition rate temperature measurement of combustion flames
[AD-D012154] N86-24780
COMETS
A plasma wave instrument on the AMPTE/IRM (Active Magnetospheric Particle Tracing Explorers/Ion Release Module) spacecraft
[AD-A163048] N86-25074
An analysis of the accessibility of Earth-approaching asteroids
[AD-A163976] N86-25313
COMMERCIAL AIRCRAFT
Wind tunnel technology for the development of future commercial aircraft
[NASA-TM-88390] N86-24710
COMMUNICATION NETWORKS
Impact of the 1985 Space World Administrative Radio Conference on frequency/orbit planning and use
[NASA-TM-87285] N86-24881
DSCS network performance software support. Revision
[AD-A163530] N86-25163
Defense data Network/TOPS-20 tutorial: An interacive computer program
[AD-A163675] N86-25294
COMMUNICATION SATELLITES
Satellite voice broadcast. Volume 1: Executive summary
[NASA-CR-175016] N86-24875
Satellite voice broadcast. Volume 2: System study
[NASA-CR-175017] N86-24876
Impact of the 1985 Space World Administrative Radio Conference on frequency/orbit planning and use
[NASA-TM-87285] N86-24881
Partial-discharge tests of multiwinding high-voltage transformers for space TWTAs (Traveling-Wave Tube Amplifiers)
[AD-A163862] N86-24915
COMMUNICATION THEORY
Man-machine systems of the 1990 decade: Cognitive factors and human interface issues
[AD-A163865] N86-25123

COMMUTATORS
Circuits and exchange parameters at the C2 interface in the case of sequential input-output of discrete information
[AD-A163688] N86-24884
COMPACTING
Damping properties os granule-based composite materials
[BLL-M-36692-(5828.4)] N86-24754
Binders for compacting nitride type ceramics
[NASA-TM-88397] N86-24844
COMPARATORS
Journal of Research of the National Bureau of Standards, volume 90, number 4, July-August 1985
[PB86-137627] N86-24786
COMPARISON
Comparison of background characteristics of an RCS (Radar Cross Section) measurement range using a CW-Nulling technique and a pulse-gating technique
[AD-A163965] N86-24896
COMPARTMENTS
Heat transfer in compartment fires near regions of ceiling jet-wall impingement N86-24866
COMPATIBILITY
Behavioral considerations for space station design
[AD-A163478] N86-25118
Analysis and design of a parameterized protocol converter
[AD-A164171] N86-25137
COMPENSATORS
Development of a Digital Interactive Controller Evaluation System (DICES)
[AD-A163966] N86-25164
Study of the effects of discretizing quantitative feedback theory analog control system designs
[AD-A164209] N86-25174
COMPILERS
Using Ada in the real-time avionics environment issues and conclusions
[AD-A163844] N86-25151
COMPOSITE MATERIALS
Damping properties os granule-based composite materials
[BLL-M-36692-(5828.4)] N86-24754
Analysis of the stress state in an losipescu sheartest specimen
[NASA-CR-176745] N86-24755
Effects of seawater and deionized water at 0 to 80 deg C on the flexural properties of a glass/epoxy composite
[NASA-TM-86544] N86-24758
Simplified composite micromechanics for predicting microstresses
[NASA-TM-87295] N86-24759
Evaluation of capillary reinforced composites
[NASA-CR-175061] N86-24760
A mixture model for unidirectionally fiber-reinforced composites
[AD-A164136] N86-24764
Detection and location of ballistic damage in composite materials using acoustic emission methods
[AD-A164183] N86-24766
Residual-stress induced damage in composite materials
[AD-A164191] N86-24767
Three dimensional finite element analysis of failure in composite laminates N86-24768
Physico-chemical factors affecting hydrothermal resistance and bonding of polymeric composites to steel surfaces
[AD-A163906] N86-24852
COMPOSITE PROPELLANTS
Calculated research on the energetic characteristic of TN in composite solid propellant
[AD-A163691] N86-24859
COMPOSITE STRUCTURES
Residual-stress induced damage in composite materials
[AD-A164191] N86-24767
COMPOSITION (PROPERTY)
Introduction to free atoms and particles
[AD-A163586] N86-25224
Theoretical investigation of point defects of mercury cadmium telluride A01
[AD-A163735] N86-25277
COMPRESSIBLE FLOW
Unsteady solution of the boundary layer equations with application to space shuttle tiles
[AD-A164105] N86-24727
Stationary motions and incompressible limit for compressible viscous fluids
[AD-A163600] N86-24941
Adaptive-grid optimization for minimizing steady-state, truncation error
[AD-A164038] N86-24948
COMPRESSIBLE FLUIDS
Stationary motions and incompressible limit for compressible viscous fluids
[AD-A163600] N86-24941
COMPRESSING
Compacting kinetics of metal powders during pressing
[BLLD-5828.4-M-36666] N86-24800
COMPRESSOR BLADES
Effects of surface roughness on pressure distribution and boundary layer over compressor blades at high Reynolds number in a two-dimensional cascade
[AD-A163974] N86-24946
COMPUTATION
Competing unimolecular reactions of flame radicals. Part 1: Isomerization and dissociation of the methoxy radical
[AD-A164154] N86-24783
Numerical flow field calculations for a missile configuration at M = .6
[AD-A164155] N86-24951
FORTRAN program for vibration and sound radiation of spherical shell
[AD-A163752] N86-25022
Electron precipitation patterns in the vicinity of a VLF transmitter
[AD-A163716] N86-25072
Architecture and numerical accuracy of high-speed DFT (Discrete Fourier Transform) processing systems
[AD-A163963] N86-25132
Knowledge-based transformational synthesis of efficient structures for concurrent computation
[AD-A164022] N86-25155
Parallel processing of region boundaries
[AD-A164112] N86-25157
Decision procedures
[AD-A163049] N86-25173
Poisson approximation of Bernoulli point processes and their superpositions, via coupling
[AD-A163442] N86-25181
Higher order residual analysis for nonlinear time series with autoregressive correlation structures
[AD-A163611] N86-25185
Improved interval bounds for ranges of functions
[AD-A163627] N86-25187
A new method for computing the generalized inverses of a matrix and its application to the Lyapunov matrix equation
[AD-A163840] N86-25194
A characterization of the chemical vapor deposition of gallium arsenide and indium phosphide in the hydride and chloride systems
[AD-A164259] N86-25279
COMPUTATIONAL FLUID DYNAMICS
Numerical solution of the Euler equations by implicit schemes with multiple grids N86-24655
Unsteady transonic flow calculations for wing-fuselage configurations
[NASA-TM-87707] N86-24657
A numerical analysis applied to high angle of attack three-dimensional inlets
[NASA-TM-87298] N86-24658
A computational study of multiple jet and wall interaction
[NASA-TM-86541] N86-24937
Separated flows
[AD-A163551] N86-24939
COMPUTATIONAL GRIDS
Adaptive-grid optimization for minimizing steady-state, truncation error
[AD-A164038] N86-24948
POSSOL: Poisson equation solver
[DE86-002292] N86-25160
Numerical grid generation for parabolic partial differential equations using marching techniques
[AD-A164020] N86-25198
COMPUTER AIDED DESIGN
A microcomputer-based menu-driven chip layout language
[AD-A164109] N86-24923
Burner liner thermal/structural load modeling: TRANCITS program user's manual
[NASA-CR-174891] N86-24931
CADS: A Computer Aided Design System, volume 1
[AD-A163556] N86-25147
Development of a computer aided design package for control system design and analysis for a personal computer (ICECAP-PC), volume 1
[AD-A163940] N86-25152
Development of a computer aided design package for control system design and analysis for a personal computer (ICECAP-PC). Volume 2
[AD-A164044] N86-25156
COMPUTER AIDED MAPPING
ROTODRAW
[PB86-131828] N86-25139
COMPUTER ASSISTED INSTRUCTION
Computer assisted instruction for the C programming language on the Zenith Z-100 microcomputer system AFIT/GCS/MA/85D-2 HC A11/MF A01
[AD-A163842] N86-25150
Education and computers: An AI (Artificial Intelligence) perspective
[AD-A163618] N86-25170
Defense data Network/TOPS-20 tutorial: An interacive computer program
[AD-A163675] N86-25294
COMPUTER GRAPHICS
Experiments with digitally mastered LaserVision optical discs
[BBC-RD-1986/1] N86-24976
A database for compounding stress intensity factors
[AD-A163779] N86-25023
ROTODRAW
[PB86-131828] N86-25139
COMPUTER INFORMATION SECURITY
Technology assessment: Methods for measuring the level of computer security
[PB86-129954] N86-25140
COMPUTER NETWORKS
Development and implementation of the x.25 protocol for the universal network interface device (UNID) 2. Volume 2
[AD-A164042] N86-25134
A network monitoring facility for a distributed data base management system
[AD-A164129] N86-25297
COMPUTER PROGRAM INTEGRITY
Technology assessment: Methods for measuring the level of computer security
[PB86-129954] N86-25140
COMPUTER PROGRAMMING
Control circuitry for high speed VLSI (Very Large Scale Integration) winograd fourier transform processors
[AD-A164043] N86-24921
Design of a digital controller for an ultragravimetric microbalance
[AD-A164014] N86-24971
Aerosol behavior modeling. Task 3: Support services for research and evaluation of severe accident phenomena and mitigation
[TI86-900242] N86-25067
Computer assisted instruction for the C programming language on the Zenith Z-100 microcomputer system AFIT/GCS/MA/85D-2 HC A11/MF A01
[AD-A163842] N86-25150
Knowledge-based transformational synthesis of efficient structures for concurrent computation
[AD-A164022] N86-25155
A comparison of estimation techniques for the three parameter Pareto distribution
[AD-A163831] N86-25192
Design and implementation of a centralized data directory for a distributed database management system
[AD-A163843] N86-25295
COMPUTER PROGRAMS
ALESEP. Part 2: A computer program for the analysis of leading edge separation bubbles on infinite swept wings
[NASA-CR-178015] N86-24664
Data sources for parameters used in predictive modeling of fire growth and smoke spread
[PB86-130986] N86-24788
Computerized upper-boundary-value solutions of problems in mechanical working of metals
[BLL-M-36627-(5828.4)] N86-25013
FORTRAN program for vibration and sound radiation of spherical shell
[AD-A163752] N86-25022
A database for compounding stress intensity factors
[AD-A163779] N86-25023
Overview of software development at the parabolic dish test site
[JPL-PUBL-85-56] N86-25044
Description of a two-dimensional atmospheric transport model
[DAR-TP-11] N86-25055
Development of a run time math library for the 1750A airborne microcomputer
[AD-A163905] N86-25131
Development and implementation of the x.25 protocol for the universal network interface device (UNID) 2. Volume 2
[AD-A164042] N86-25134
ROTODRAW
[PB86-131828] N86-25139
Data analysis on the rotor test stand program for interactive processing
[NASA-TM-77948] N86-25146

Comparison of absorption and radiation boundary conditions using a time-domain three-dimensional finite difference electromagnetic computer code
[AD-A163828] N86-25149
Development of a computer aided design package for control system design and analysis for a personal computer (ICECAP-PC), volume 1
[AD-A163940] N86-25152
Examination of the Circle Spline routine
[DE86-004361] N86-25161
Modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises tests for the Pareto distribution with unknown location and scale parameters
[AD-A163837] N86-25193
A test for program effect in the absence of a proper control group
[AD-A163783] N86-25204
Nuclear structure studies by the scattering of medium-energy electrons
[DE86-002265] N86-25234
Application of hierarchical data structures to geographical information systems
[AD-A163674] N86-25293
Defense data Network/TOPS-20 tutorial: An interacive computer program
[AD-A163675] N86-25294
A network monitoring facility for a distributed data base management system
[AD-A164129] N86-25297

COMPUTER STORAGE DEVICES
Interactive communication channel
[AD-D011968] N86-24893
Optical disk technology for large scale mass storage
[AD-A163453] N86-25127
Permanent file backup for the CDC mass store system
[AD-A163524] N86-25128
Microprocessor controller with nonvolatile memory implementation
[AD-A164152] N86-25136

COMPUTER SYSTEMS DESIGN
The implementation and use of Ada on distributed systems with high reliability requirements
[NASA-CR-176760] N86-25142
Combining and connecting linear, multi-input, multi-output subsystem models
[NASA-TM-85912] N86-25166

COMPUTER SYSTEMS PROGRAMS
ROTODRAW
[PB86-131828] N86-25139
An empirical study of flight control software reliability
[NASA-CR-178058] N86-25145
DSCS network performance software support. Revision
[AD-A163530] N86-25163

COMPUTER TECHNIQUES
Man-machine systems of the 1990 decade: Cognitive factors and human interface issues
[AD-A163865] N86-25123
Permanent file backup for the CDC mass store system
[AD-A163524] N86-25128
Architecture and numerical accuracy of high-speed DFT (Discrete Fourier Transform) processing systems
[AD-A163963] N86-25132
Parallel image transmission through a single optical fiber
[AD-A163809] N86-25241

COMPUTERIZED SIMULATION
Investigation of rolling-up and interaction of leading-edge and trailing-edge vortex sheets on a slender delta wing
[AD-A163692] N86-24668
A real-time simulation evaluation of an advanced detection, isolation and accommodation algorithm for sensor failures in turbine engines
[NASA-TM-87289] N86-24697
Estimation of ICBM (intercontinental ballistic missile) performance parameters
[AD-A164021] N86-24725
A computer modeling methodology and tool for assessing design concepts for the Space Station Data Management System
[NASA-TM-87647] N86-24737
A proposed design for an interim space rescue ferry vehicle
[AD-A164039] N86-24741
The science of and advanced technology for cost-effective manufacture of high precision engineering products. Volume 4. Thermal effects on the accuracy of numerically controlled machine tool
[AD-A163598] N86-24871
Airborne bistatic radar limitations and sample calculations
[AD-A163941] N86-24892
Simulation of chaff cloud signature
[AD-A164106] N86-24898
Control circuitry for high speed VLSI (Very Large Scale Integration) winograd fourier transform processors
[AD-A164043] N86-24921
System life and reliability modeling for helicopter transmissions
[NASA-CR-3967] N86-24990
Predicting the effects of overloads on sustained-load crack growth in a high-temperature superalloy
[AD-A164018] N86-25026
Architecture and numerical accuracy of high-speed DFT (Discrete Fourier Transform) processing systems
[AD-A163963] N86-25132
Introduction to the microcomputers for solving radar and electronic warfare problems
[AD-A164143] N86-25135
Computer model of a passive synthetic aperture imaging system
[AD-A164144] N86-25158
Analysis of a distributed decision algorithm
[AD-A164181] N86-25159
Development of a Digital Interactive Controller Evaluation System (DICES)
[AD-A163966] N86-25164
Education and computers: An AI (Artificial Intelligence) perspective
[AD-A163618] N86-25170
State estimation procedure based upon the duality concept
[INPE-3796-PRE/891] N86-25179
Preliminary kalman filter design to improve air combat maneuvering target estimation for the F-4E/G fire control system
[AD-A164034] N86-25200
Continuous representations of digital images
[AD-A164189] N86-25245

COMPUTERS
Real-time flight test PCM data acquisition monitor
[AD-A164035] N86-24897
Unified matrices for electronic computers
[AD-A163689] N86-25130

CONCAVITY
Experimental investigation of turbulent heat transfer in straight and curved rectangular ducts
[AD-A164142] N86-24950

CONCENTRATION (COMPOSITION)
Criteria for significance of simultaneous presence of both condensible vapors and aerosol particles on mass transfer (deposition) rates
[NASA-TM-87247] N86-24869

CONCENTRIC CYLINDERS
Method of producing a three-dimensional coordinate grid
[BLLD-5828.4-M-36664] N86-24799

CONCORDE AIRCRAFT
Selections from Flug Revue und Flugwelt International. A. On the border of Time-hypersonic flight. B. NASA programs pave the way for the hypersonic aircraft. C. Shuttle flight 61-B; construction in space. D. Faster than a bullet; hypersonic military aircraft
[NASA-TM-88418] N86-24652

CONCRETE STRUCTURES
Nonlinear earthquake analysis of concrete building structures
[AD-A163517] N86-25021

CONDENSATION
Vapor-screen flow-visualization experiments in the NASA Langley 0.3-m transonic cryogenic tunnel
[NASA-CR-3984] N86-24661

CONDENSERS (LIQUEFIERS)
Reciprocity calibration in a plane wave resonator
[AD-A164149] N86-24972

CONDENSING
Aerosol behavior modeling. Task 3: Support services for research and evaluation of severe accident phenomena and mitigation
[TI86-900242] N86-25067
The behavior of cloud droplets in an acoustic field: A numerical investigation
[AD-A163704] N86-25081

CONDUCTIVE HEAT TRANSFER
Mathematical model of temperature conditions of cooling of metal during plastic deformation
[BLLD-5828.4-M-36663] N86-24798

CONDUCTORS
Electromagnetic scattering from a slotted TM cylindrical conductor by the pseudo-image method
[AD-A163782] N86-24887

CONFERENCES
Proceedings of Conference on International Standards
[PB86-130044] N86-24872
Technical evaluation report on the ElectromagneticWave Propagation Panel Symposium on Propagation Effects on Military Systems in the High Latitude Region
[AGARD-AR-218] N86-24903

CONFIDENCE LIMITS
Verification of a Monte Carlo simulation method to find lower confidence limits for the availability and reliability of maintained systems
[AD-A163832] N86-25005

CONFINEMENT
Connecting mathematics, science and high technology: Research on solutions to nonlinear partial differential equations, bifurcation phenomena, and constructive methods for implementing the calculus of variations for relevant, physical problems
[AD-A162827] N86-25197

CONFORMAL MAPPING
ROTODRAW
[PB86-131828] N86-25139

CONGRESSIONAL REPORTS
Science policy study. Volume 7: International cooperation in science
[GPO-52-283] N86-25301

CONICAL SCANNING
Optimal estimation of target in clutter (CHAFF) from radar
[AD-A164200] N86-24901

CONNECTORS
Orientation of circular connectors using vision processing
[AD-D012153] N86-24918

CONSISTENCY
Characterization of the consistent weighted regression estimators
[AD-A163605] N86-25183

CONSTRAINTS
Research animal stanchion and transporter
[AD-A163907] N86-25110
The design, fabrication and delivery of a manipulator foot restraint mockup for space telescope development testing
[NASA-CR-178837] N86-25121
Cost estimating relationships for fixed wing aircraft: List price versus empty weight
[AD-A164196] N86-25300
Research and competition: Best partners
[NASA-TM-87313] N86-25321

CONSTRUCTION
Surface construction from planar contours
[AD-A163610] N86-25184

CONTAMINANTS
Isotopic study of the inhalation toxicology of oxidants
[PB86-109485] N86-25116

CONTINENTAL SHELVES
Outer Continental Shelf Environmental Assessment Program. Reports of principal investigators, volume 33
[PB86-134780] N86-25061
Outer Continental Shelf Environment Assessment Program: Reports of principal investigators, volume 32
[PB86-134772] N86-25065

CONTINUOUS WAVE LASERS
Reverse-wave suppressor mirror effects on CW HF unstable ring laser performance
[AD-A163529] N86-24979
Remote sensing of atmospheric winds by utilizing speckle-turbulence interaction and optical heterodyne detection
[AD-A164187] N86-25087

CONTINUOUS WAVE RADAR
Method and apparatus for measuring distance
[NASA-CASE-MSC-20912-1] N86-24879

CONTINUUM MODELING
On K-BKZ and other viscoelastic models as continuum generalization of the classical Spring-Dashpot models
[AD-A163703] N86-24943
A computational model for contact stress problems AD-A164190
[AD-A164190] N86-25027

CONTOURS
The determination of the natural frequencies and mode shapes for anisotropic laminated plates including the effects of shear deformation and rotatory inertia
[AD-A164040] N86-24763
Surface construction from planar contours
[AD-A163610] N86-25184
Application of hierarchical data structures to geographical information systems
[AD-A163674] N86-25293

CONTRACT MANAGEMENT
Application of hierarchical data structures to geographical information systems
[AD-A163674] N86-25293

CONTRAST
Analysis of contrast sensitivity and spectral response of imaging systems
[AD-A164228] N86-25247

CONTROL BOARDS
Controlling nonpoint pollution in Virginia's urbanizing areas: An institutional perspective
[AD-A163693] N86-25057

CONTROL EQUIPMENT
Advanced on-site power plant development technology program
[NASA-CR-174709] N86-25040
CONTROL MOMENT GYROSCOPES
Evaluation of a double Gimbal IPACS design
[NASA-CR-178040] N86-24745
CONTROL SIMULATION
Multivariable control law design for enhanced air combat maneuvering. F-15/STOL (Short Take-Off and Landing) derivative fighter
[AD-A164017] N86-24706
A proposed design for an interim space rescue ferry vehicle
[AD-A164039] N86-24741
CONTROL SURFACES
Experimental assessment of vortex retaining cavity flaps for maneuverability improvement on delta wing fighter aircraft
[AD-A164104] N86-24690
Multivariable control law design for enhanced air combat maneuvering. F-15/STOL (Short Take-Off and Landing) derivative fighter
[AD-A164017] N86-24706
Numerical flow field calculations for a missile configuration at M = .6
[AD-A164155] N86-24951
CONTROL SYSTEMS DESIGN
LQG/LTR design of a robust flight controller for the STOL F-15
[AD-A164111] N86-24708
Laser beam duct pressure controller system
[AD-D012017] N86-24964
Development of a computer aided design package for control system design and analysis for a personal computer (ICECAP-PC), volume 1
[AD-A163940] N86-25152
Development of a computer aided design package for control system design and analysis for a personal computer (ICECAP-PC). Volume 2
[AD-A164044] N86-25156
CONTROL THEORY
Multivariable control law design for enhanced air combat maneuvering. F-15/STOL (Short Take-Off and Landing) derivative fighter
[AD-A164017] N86-24706
CONTROL UNITS (COMPUTERS)
Gyro and accelerometer based navigation system for a mobile autonomous robot
[AD-A164036] N86-24682
Development of a computer aided design package for control system design and analysis for a personal computer (ICECAP-PC). Volume 2
[AD-A164044] N86-25156
CONTROLLED ATMOSPHERES
Automating knowledge acquisition in a flightline robot
[AD-A163829] N86-24997
CONTROLLERS
Eigenstructure assignment and its application in design of flight control systems
[NASA-TM-88411] N86-24701
Development of a Digital Interactive Controller Evaluation System (DICES)
[AD-A163986] N86-25164
CONVECTION CLOUDS
Modeling transport by convective clouds for regional air pollution models
[PB86-144623] N86-25060
A plasma wave instrument on the AMPTE/IRM (Active Magnetospheric Particle Tracing Explorers/Ion Release Module) spacecraft
[AD-A163048] N86-25074
CONVECTIVE HEAT TRANSFER
Convective heating of energetic materials
[AD-A163919] N86-24778
Experimental investigation of turbulent heat transfer in straight and curved rectangular ducts
[AD-A164142] N86-24950
Effect of forced convection heat transfer on weld pools
[AD-A163970] N86-24998
CONVERGENCE
The determination of the natural frequencies and mode shapes for anisotropic laminated plates including the effects of shear deformation and rotatory inertia
[AD-A164040] N86-24763
A trust region algorithm for nonlinearly constrained optimization
[AD-A163986] N86-25154
Numerical approximation for the infinite-dimensional discrete-time optimal linear-quadratic regulator problem
[NASA-CR-178081] N86-25176
Convergence of cubic spline interpolation with the Not-A-Knot condition
[AD-A163705] N86-25190
A convergence theorem for Newton's method in Banach spaces
[AD-A163625] N86-25209
CONVERGENT-DIVERGENT NOZZLES
An experimental study of clustered nozzles with variable shrouds
[AD-A163961] N86-24945
CONVEXITY
Experimental investigation of turbulent heat transfer in straight and curved rectangular ducts
[AD-A164142] N86-24950
COOLING
Radical fluorescence studies with liquid propellants
[AD-A163472] N86-24857
Quantum theory of ion motion and laser cooling in a radio frequency quadrupole trap
[AD-A163838] N86-25212
COORDINATES
Method of producing a three-dimensional coordinate grid
[BLLD-5828.4-M-36664] N86-24799
COPOLYMERS
Poly(carbonate-mide) polymer
[NASA-CASE-LAR-13292-1] N86-24841
Method for making heterocyclic block copolymer
[AD-D011971] N86-24853
COPPER OXIDES
Removal of sulfur and nitrogen containing pollutants from discharge gases
[DE85-017799] N86-25058
CORE STORAGE
Unified matrices for electronic computers
[AD-A163689] N86-25130
CORES
A method for fabricating magnetodielectric cores
[AD-A163457] N86-24911
Education and computers: An AI (Artificial Intelligence) perspective
[AD-A163618] N86-25170
CORRELATION
Evaluation of NOGAPS 2.1 (Navy Operational Global Atmospheric Prediction System 2.1) systematic error - winter 1983 - 1984
[AD-A163812] N86-25082
Statistical inferences in cross-lagged panel studies
[AD-A163892] N86-25120
CORRELATION COEFFICIENTS
Higher order residual analysis for nonlinear time series with autoregressive correlation structures
[AD-A163611] N86-25185
CORROSION
Corrosion of nickel and cobalt base alloys in sulfate melts at 750 deg C
[NASA-CR-175111] N86-24817
Hot gas corrosion of silicon based ceramics
[AD-A163810] N86-24850
CORROSION PREVENTION
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 1. Sections 1 to 8
[AD-A163670] N86-24822
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 2: Appendices A3, A4, A6, A8
[AD-A163671] N86-24823
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 3: Appendix A7
[AD-A163672] N86-24824
Low-solvent primer and finish coats for use on steel structures
[PB86-139326] N86-24834
COSMIC PLASMA
Research in particles and fields
[NASA-CR-176763] N86-25017
COSMIC RAYS
Research in particles and fields
[NASA-CR-176763] N86-25017
Gamma-ray background induced in a double Ge(Li) spectrometer at balloon altitudes in the hemisphere
[INPE-3797-PRE/892] N86-25317
Abundances of heavy cosmic rays at energies up to 1000 GeV/amu N86-25318
Abundances and energy spectra of high energy heavy cosmic-ray nuclei N86-25319
COST ANALYSIS
Strategic missile (Minuteman) operating and support cost factors
[AD-A163534] N86-24723
Biomass economy
[AD-A163647] N86-25048
A survey of O and S (Operating and Support) cost models
[AD-A163438] N86-25287
COST EFFECTIVENESS
Evaluation of propfan propulsion applied to general aviation
[NASA-CR-175020] N86-24695
The science of and advanced technology for cost-effective manufacture of high precision engineering products. Volume 4. Thermal effects on the accuracy of numerically controlled machine tool
[AD-A163598] N86-24871
Adaptive control, learning, and cost-effective sensor systems for robotics or advanced automation systems
[AD-A163615] N86-24996
Biomass economy
[AD-A163647] N86-25048
Centerville Beach. Project completion report
[AD-A163461] N86-25056
A definition study of an Advanced Data Collection and Location System (ADCLS)
[NASA-CR-177867] N86-25291
COST ESTIMATES
Strategic missile (Minuteman) operating and support cost factors
[AD-A163534] N86-24723
Cost estimating relationships for fixed wing aircraft: List price versus empty weight
[AD-A164196] N86-25300
COSTS
An LQG up-and away flight control design for the STOL F-15 aircraft
[AD-A164108] N86-24707
Behavioral considerations for space station design
[AD-A163478] N86-25116
COUPLERS
Reciprocity calibration in a plane wave resonator
[AD-A164149] N86-24972
COUPLING
Poisson approximation of Bernoulli point processes and their superpositions, via coupling
[AD-A163442] N86-25161
COUPLINGS
Optical star coupler with large number of inputs and outputs
[NASA-TM-88395] N86-25237
COVARIANCE
Remote measurement of the atmospheric isoplanatic angle and determination of refractive turbulence profiles by direct inversion of the scintillation amplitude covariance function with Tikhonov regularization
[AD-A163629] N86-25239
COVERINGS
Centerville Beach. Project completion report
[AD-A163461] N86-25056
CRACK PROPAGATION
Simplified composite micromechanics for predicting microstresses
[NASA-TM-87295] N86-24759
Damage models for delamination and transverse fracture in fibrous composites
[AD-A164164] N86-24765
Residual-stress induced damage in composite materials
[AD-A164191] N86-24767
Thermal-mechanical fatigue behavior of nickel-base superalloys
[NASA-CR-175048] N86-24818
Constant-Load-Amplitude fatigue crack growth testing of cast aluminum alloys A201-T7 and A357-T6
[AD-A163494] N86-24821
Cracking resistance in a 4.5-inch (114-mm) plate of 7075-T7351 aluminum alloy
[AD-A164229] N86-24829
Crack healing in polymers
[AD-A164130] N86-24856
Crack growth on a PWR-RPV nozzle corner under cyclic thermal shock load
[BLL-RISLEY-TR-5284-(9091.9F)] N86-25016
Predicting the effects of overloads on sustained-load crack growth in a high-temperature superalloy
[AD-A164018] N86-25026
Dynamic moire interferometry in mechanics research
[DE86-004128] N86-25028
CRACKING (CHEMICAL ENGINEERING)
Catalysis of hydrolysis reactions by platinum and nickel phosphine complexes
[AD-A163666] N86-24775
CRACKS
Predicting the effects of overloads on sustained-load crack growth in a high-temperature superalloy
[AD-A164018] N86-25026
CREEP BUCKLING
Effects of state recovery on creep buckling under variable loading
[NASA-CR-175094] N86-25310

CRITERIA
Test results for developing revised LORAN-C protection criteria AD-A164139 DOT-TSC-CG-85-4 DOT-CG-N-1-86 HC A04/MF A01
[AD-A164139] N86-24683

CRITICAL TEMPERATURE
Thin film technology of high-critical-temperature superconducting electronics
[AD-A136053] N86-25278

CROSS CORRELATION
Effects of convergence zone multipath on crosscorrelation
[AD-A163650] N86-25221

CROSS FLOW
Natural laminar flow flight experiments on a swept wing business jet-boundary layer stability analyses
[NASA-CR-3975] N86-24659

CROSSINGS
Relative positioning of ocean bottom benchmarks AD-A164177 HC A05/MF A01
[AD-A164177] N86-24684

CROSSLINKING
Process for crosslinking methylene-containing aromatic polymers with ionizing radiation
[NASA-CASE-LAR-13448-1] N86-24840

CRYOGENIC EQUIPMENT
Thermal performance evaluation of the infrared telescope dewar subsystem
[NASA-TM-86543] N86-25305

CRYOGENIC WIND TUNNELS
Vapor-screen flow-visualization experiments in the NASA Langley 0.3-m transonic cryogenic tunnel
[NASA-CR-3984] N86-24661
R4 airfoil data corrected for sidewall boundary-layer effects in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TP-2565] N86-24662
Dynamic measurement of total temperature, pressure and velocity in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TP-2584] N86-24709

CRYOGENICS
Passive eddy-current damping as a means of vibration control in cryogenic turbomachinery
[NASA-TP-2562] N86-24722

CRYSTAL DEFECTS
Impurity diffusion in NiO grain boundaries
[AERE-R-11763] N86-25280

CRYSTAL GROWTH
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163537] N86-25272
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163559] N86-25273
The photoelectrochemical properties of MoS sub2 single crystals grown in the presence of cobalt
[AD-A163592] N86-25276

CRYSTAL LATTICES
Crystallographic texture: Experimental geometry and defocussing correction
[AERE-R-11723] N86-25266

CRYSTAL STRUCTURE
Effect of forced convection heat transfer on weld pools
[AD-A163970] N86-24998
Crystallographic texture: Experimental geometry and defocussing correction
[AERE-R-11723] N86-25266
Isolation and characterization of an organogallium-arsenic cluster: Crystal structure of ((PhAsH)(R2Ga)(PhAs)6(RGa)4)(R=Me3SiCH2)
[AD-A163485] N86-25271

CRYSTAL SURFACES
Method of making a resonator having a desired frequency from a quartz crystal resonator plate
[AD-D012157] N86-24919

CRYSTALLINITY
Accurate sturcture factor determination of binary cubic solid solutions
[DE86-002891] N86-24832
Abrasion and deformed layer formation of manganese-zinc ferrite in sliding contact with lapping tapes
[NASA-TM-87249] N86-24838

CRYSTALLITES
Crystallographic texture: Experimental geometry and defocussing correction
[AERE-R-11723] N86-25266

CRYSTALLIZATION
Melting of solid solution during crystallization of alloy white cast iron
[BLL-M-36677-(5828.4)] N86-24796

CRYSTALLOGRAPHY
Crystallographic texture: Experimental geometry and defocussing correction
[AERE-R-11723] N86-25266

CRYSTALS
Electron microscopy observation of electrotransport
[AD-A164107] N86-25213
Isolation and characterization of an organogallium-arsenic cluster: Crystal structure of ((PhAsH)(R2Ga)(PhAs)6(RGa)4)(R=Me3SiCH2)
[AD-A163485] N86-25271

CUMULUS CLOUDS
Satellite cloud and precipitation analysis using a minicomputer
[AD-A163821] N86-25084

CURVATURE
Experimental investigation of turbulent heat transfer in straight and curved rectangular ducts
[AD-A164142] N86-24950

CUSHIONS
A review of the pilot backache problem in the CH113 Labrador helicopter
[AD-A164011] N86-25113

CYCLES
Lubricant foaming and aeration study, part 2
[AD-A163696] N86-24849
Man-machine systems of the 1990 decade: Cognitive factors and human interface issues
[AD-A163865] N86-25123

CYCLIC COMPOUNDS
Synthesis of alkyl and aryl phosphazene high polymers
[AD-A163543] N86-24848

CYCLIC HYDROCARBONS
Vibrational energy transfer at a liquid gallium surface. Activation of unimolecular cyclobutene isomerization
[AD-A163023] N86-25230

CYCLONES
Forecast of Atlantic seasonal hurricane activity for 1986
[AD-A164170] N86-25080
Applications of wind empirical orthogonal functions in tropical cyclone motion studies
[AD-A164170] N86-25086

CYCLOTRON RADIATION
Induced Resonance Electron Cyclotron (IREC) quasi-optical maser
[AD-A164167] N86-24986

CYCLOTRON RESONANCE
Induced Resonance Electron Cyclotron (IREC) quasi-optical maser
[AD-A164167] N86-24986

CYLINDRICAL BODIES
Aerodynamic characteristics of gas cushion for cylinders
[BLL-M-36671-(5828.4)] N86-24656
Experimental study of the supersonic turbulent boundary layer on a blunted axisymmetric body
[AD-A163736] N86-24669
Vorticity production in delayed asymmetric cylindrical implosions
[DE86-004369] N86-24953
Nonlinear analysis of efficiency enhancement in Ubitron/Free-Electron laser amplifiers
[AD-A163619] N86-24980
Uniform transverse magnetic field inside a long cylinder
[AD-A163459] N86-25210

CYLINDRICAL SHELLS
The buckling of composite cylindrical panels considering environmental effects
[AD-A163878] N86-25024

D

DAMAGE
Electromagnetic pulse: The fifth factor in the impact of a nuclear explosion
[AD-A163695] N86-24885

DAMAGE ASSESSMENT
Detection and location of ballistic damage in composite materials using acoustic emission methods
[AD-A164163] N86-24766
Residual-stress induced damage in composite materials
[AD-A164191] N86-24767

DAMPING
Passive eddy-current damping as a means of vibration control in cryogenic turbomachinery
[NASA-TP-2562] N86-24722
Damping properties os granule-based composite materials
[BLL-M-36692-(5828.4)] N86-24754

DATA ACQUISITION
Space Shuttle flying qualities criteria assessment. Phase 5: Data acquistion and analysis
[NASA-CR-166618] N86-24704
Moving-bank multiple model adaptive algorithms applied to flexible spacecraft control
[AD-A164016] N86-24740
Real-time flight test PCM data acquisition monitor
[AD-A164035] N86-24897
Overview of software development at the parabolic dish test site
[JPL-PUBL-85-56] N86-25044
A seawater battery monitor with fiber optic remote data acquisition capability
[AD-A164178] N86-25052
Absolute bounds on set intersection and union sizes from distribution information
[AD-A164025] N86-25199
A definition study of an Advanced Data Collection and Location System (ADCLS)
[NASA-CR-177867] N86-25291

DATA BASE MANAGEMENT SYSTEMS
A data base and analysis program for shuttle main engine dynamic pressure measurements
[NASA-CR-178808] N86-24750
Chemical Thermodynamics in Steam Power Cycles Data Requirements
[PB86-130937] N86-24787
Analysis of integrated and nonintegrated voice and data networks for DoD communications
[AD-A164176] N86-24899
Benchmark analysis of database architectures: A case study
[PB86-126667] N86-25162
Design and implementation of a centralized data directory for a distributed database management system
[AD-A163843] N86-25295
The design and implementation of a relational to network query translator for a distributed database management system
[AD-A164013] N86-25296
A network monitoring facility for a distributed data base management system
[AD-A164129] N86-25297

DATA BASES
Advanced turboprop vibratory characteristics
[NASA-CR-174708] N86-24693
A database for compounding stress intensity factors
[AD-A163779] N86-25023
Molecular absorption of atmospheric species
[AD-A164024] N86-25075
Content-Addressable Memory manager: Design and evaluation
[AD-A164037] N86-25133
The use of controlled redundancy in self-adaptive databases N86-25141
Application of hierarchical data structures to geographical information systems
[AD-A163674] N86-25293
An analysis of the accessibility of Earth-approaching asteroids
[AD-A163976] N86-25313

DATA CORRELATION
Exploratory projection pursuit
[AD-A163019] N86-25207

DATA LINKS
Mode S data link phase coding
[AD-A163745] N86-24886
Development and implementation of the x.25 protocol for the universal network interface device (UNID) 2. Volume 2
[AD-A164042] N86-25134

DATA MANAGEMENT
A computer modeling methodology and tool for assessing design concepts for the Space Station Data Management System
[NASA-TM-87647] N86-24737
Real-time flight test PCM data acquisition monitor
[AD-A164035] N86-24897
Analysis of integrated and nonintegrated voice and data networks for DoD communications
[AD-A164176] N86-24899
Absolute bounds on set intersection and union sizes from distribution information
[AD-A164025] N86-25199

DATA PROCESSING
Colour encoding and decoding techniques for line-locked sampled PAL and NTSC television signals
[BBC-RD-1986/2] N86-24874
Arithmetic circuitry for high speed VLSI Winograd Fourier transform processor
[AD-A163943] N86-24917
Adaptive control, learning, and cost-effective sensor systems for robotics or advanced automation systems
[AD-A163615] N86-24996

Physical oceanographic data marginal ice zone experiment R/V POLAR QUEEN, June-July 1984
[AD-A163591] N86-25101
Man-machine systems of the 1990 decade: Cognitive factors and human interface issues
[AD-A163865] N86-25123
Data analysis on the rotor test stand program for interactive processing
[NASA-TM-77948] N86-25146
Robust/resistant techniques of data analysis
[AD-A163972] N86-25153
A test for program effect in the absence of a proper control group
[AD-A163783] N86-25204
Application of hierarchical data structures to geographical information systems
[AD-A163674] N86-25293
Research and technology, fiscal year 1985
[NASA-TM-88753] N86-25320

DATA PROCESSING EQUIPMENT
Circuits and exchange parameters at the C2 interface in the case of sequential input-output of discrete information
[AD-A163688] N86-24884

DATA RECORDING
Optical disk technology for large scale mass storage
[AD-A163453] N86-25127

DATA REDUCTION
Overview of software development at the parabolic dish test site
[JPL-PUBL-85-56] N86-25044
Robust/resistant techniques of data analysis
[AD-A163972] N86-25153
The analysis of near-Earth satellite astrometric data at the ETS
[AD-A163902] N86-25312

DATA RETRIEVAL
Examination of the Circle Spline routine
[DE86-004361] N86-25161

DATA SMOOTHING
Nonparametric and parametric estimation of wave statistics and spectra
[PB86-141967] N86-25105

DATA STORAGE
Design methodology of an automated scattering measurement facility
[AD-A163896] N86-24891
Permanent file backup for the CDC mass store system
[AD-A163524] N86-25128

DATA STRUCTURES
Application of hierarchical data structures to geographical information systems
[AD-A163674] N86-25293

DATA TRANSMISSION
Circuits and exchange parameters at the C2 interface in the case of sequential input-output of discrete information
[AD-A163688] N86-24884
Analysis of integrated and nonintegrated voice and data networks for DoD communications
[AD-A164176] N86-24899

DECAY
The ecology of irregularly flooded salt marshes of the northeastern Gulf of Mexico: A community profile
[TI86-900237] N86-25068

DECELERATION
Altitude ignition/lean decel study
[AD-A163052] N86-24781

DECISION MAKING
Application of artificial intelligence to improve aircraft survivability
[AD-A164172] N86-24674
Moving-bank multiple model adaptive algorithms applied to flexible spacecraft control
[AD-A164016] N86-24740
Analysis of a distributed decision algorithm
[AD-A164181] N86-25159
Decision procedures
[AD-A163049] N86-25173
A fuzzy set approach to vulnerability analysis AD-A163921 BRL-TR-2697 HC A03/MF A01
[AD-A163921] N86-25196
Evaluating R and D and new product development ventures: An overview of assessment methods $12.00/MF A01
[PB86-110806] N86-25289

DECISION THEORY
Moving-bank multiple model adaptive algorithms applied to flexible spacecraft control
[AD-A164016] N86-24740

DECOMPOSITION
Conductimetric determination of decomposition of silicate melts
[NASA-TM-88394] N86-24769
CARS (Coherent Anti-Stokes Raman Scattering) spectroscopy of the reaction zone of methane-nitrous oxide and RDX propellant flames
[AD-A163465] N86-24773
Determination of initial chemical steps in the gas-phase decomposition of energetic molecules
[AD-A163751] N86-24777
Characterization of the consistent weighted regression estimators
[AD-A163605] N86-25183
Bias and efficiency of the consistent weighted regression estimators in finite population sampling HC A03/MF A01
[AD-A163601] N86-25203
Time and state resolved studies of molecular decomposition
[AD-A163881] N86-25227

DEFECTS
Cracking resistance in a 4.5-inch (114-mm) plate of 7075-T7351 aluminum alloy
[AD-A164229] N86-24829
Non-destructive laser holographic testing of solid propellant for unbonding defects
[AD-A163694] N86-24860
Static and dynamic tensile tests on wide X 6 CrNi 18 11 steel plates to demonstrate the integrity of the reactor tank for the SNR 300 fast sodium-cooled reactor
[BLL-RISLEY-TR-5280-(9091.9F)] N86-25009

DEFENSE COMMUNICATIONS SATELLITE SYSTEM
DSCS network performance software support. Revision
[AD-A163530] N86-25163

DEFLECTION
Experimental assessment of vortex retaining cavity flaps for maneuverability improvement on delta wing fighter aircraft
[AD-A164104] N86-24690
Non-perturbing beam deflection system and method for high repetition rate temperature measurement of combustion flames
[AD-D012154] N86-24780

DEFORMATION
The determination of the natural frequencies and mode shapes for anisotropic laminated plates including the effects of shear deformation and rotatory inertia
[AD-A164040] N86-24763
Reasons for low plasticity of steel of Type 25-20
[BLL-36604-SER-M-5828.4] N86-24790
Advanced processing and properties of high performance alloys
[AD-A163469] N86-24820
Crack healing in polymers
[AD-A164130] N86-24856
Question of application of method of finite elements to problems of deformation of incompressible media
[BLLD-5828.4-M-36665] N86-25012
Computerized upper-boundary-value solutions of problems in mechanical working of metals
[BLL-M-36627-(5828.4)] N86-25013

DEGENERATION
Routing of high data rate signals using degenerate four wave mixing in BSO
[AD-A163746] N86-25240

DEGREES OF FREEDOM
A computational model for contact stress problems AD-A164190
[AD-A164190] N86-25027

DEICING
Evaluation of capillary reinforced composites
[NASA-CR-175061] N86-24760

DEIONIZATION
Effects of seawater and deionized water at 0 to 80 deg C on the flexural properties of a glass/epoxy composite
[NASA-TM-86544] N86-24758

DELAY
Vorticity production in delayed asymmetric cylindrical implosions
[DE86-004369] N86-24953

DELTA WINGS
Vapor-screen flow-visualization experiments in the NASA Langley 0.3-m transonic cryogenic tunnel
[NASA-CR-3984] N86-24661
Investigation of rolling-up and interaction of leading-edge and trailing-edge vortex sheets on a slender delta wing
[AD-A163692] N86-24668
Experimental assessment of vortex retaining cavity flaps for maneuverability improvement on delta wing fighter aircraft
[AD-A164104] N86-24690
Experimental study of apex fences for lift enhancement on a highly swept delta wing configuration
[AD-A163877] N86-24705

DENSITY MEASUREMENT
Improved consolidation of silicon carbide
[NASA-TM-87243] N86-24836
Holographic investigation of solid propellant combustion in a three-dimensional motor
[AD-A164217] N86-24864
Particle simulation of low frequency fluctuations in a sheared magnetic field N86-25214

DEPOLARIZATION
Study and analysis of AlGaAs/GaA modulation doped field-effect transistors incorporating p-type Schottky gate barriers
[AD-A164103] N86-24922
Excitation anisotropy in laser-induced-fluorescence spectroscopy: Broad-line excitation case
[IPPJ-761] N86-25254

DEPOSITION
Deposition of chromium carbides on steel in atmosphere of carbon tetrachloride
[BLL-M-36693-(5828.4)] N86-24795
Aerosol behavior modeling. Task 3: Support services for research and evaluation of severe accident phenomena and mitigation
[TI86-900242] N86-25067
Overlayer-induced enhanced oxidation of GaAs surfaces
[AD-A163450] N86-25270
Thin film technology of high-critical-temperature superconducting electronics
[AD-A136053] N86-25278

DESERTS
Diagnostic study of atmosphere-terrain interaction leading to the formation of dust clouds and poor visibilities over the near east desert areas
[AD-A163890] N86-25085
Remote monitoring of processes that shape desert surfaces: The Desert Winds Project
[TI86-900108] N86-25099

DESIGN ANALYSIS
Designing a 25-kilowatt high frequency series resonant
[NASA-CR-176774] N86-24906
Dynamic and design sensitivity analysis of rigid and elastic mechanical systems with intermittent motion
[AD-A163982] N86-25025
Development of a computer aided design package for control system design and analysis for a personal computer (ICECAP-PC), volume 1
[AD-A163940] N86-25152

DESORPTION
A model for oxygen atom recombination on a silicon dioxide surface
[AD-A163990] N86-24782
Schottky barrier surface science
[AD-A163574] N86-25275
Thermal desorption study of physical forces at the PTFE surface
[NASA-TM-87090] N86-25284

DETECTION
A real-time simulation evaluation of an advanced detection, isolation and accommodation algorithm for sensor failures in turbine engines
[NASA-TM-87289] N86-24697
On detection of number of signals in presence of white noise
[AD-A164211] N86-24927
Phase-insensitive detection and the method of moments for ultrasonic tissue characterization N86-25223
Detection and exploitation of vibration induced optical amplitude modulation
[AD-A164179] N86-25244

DEUTERIUM
High resolution coherent anti-Stokes Raman spectroscopy of deuterium gas
[AD-A163946] N86-24779

DEUTERONS
Nuclear structure studies by the scattering of medium-energy electrons
[DE86-002265] N86-25234

DIAMAGNETISM
A plasma wave instrument on the AMPTE/IRM (Active Magnetospheric Particle Tracing Explorers/Ion Release Module) spacecraft
[AD-A163048] N86-25074

DIELECTRIC PERMEABILITY
Advanced artificial dielectric materials for millimeter wavelength applications. Part A
[AD-A164195] N86-24925

DIELECTRIC PROPERTIES
A method for fabricating magnetodielectric cores
[AD-A163457] N86-24911

DIELECTRICS
Configuration study of new low-loss MM (Millimeter) wave guiding structures
[AD-A163784] N86-24914
Partial-discharge tests of multiwinding high-voltage transformers for space TWTAs (Traveling-Wave Tube Amplifiers)
[AD-A163882] N86-24915

Research on devices for integrated millimeter wave systems
[AD-A163903] N86-24916
Auger electron spectroscopy, secondary ion mass spectroscopy and optical characterization of a-C-H and BN films
[NASA-TM-87258] N86-25268
DIES
Improved consolidation of silicon carbide
[NASA-TM-87243] N86-24836
DIESEL ENGINES
Joining of ceramics for advanced heavy-duty diesels
[NASA-CR-175019] N86-24846
Emissions from a light-duty diesel: Ambient temperature and fuel effects
[PB86-131349] N86-24865
DIESEL FUELS
Mechanisms of combustion of hydrocarbon/alcohol fuel blends
[AD-A163737] N86-24776
DIFFERENCE EQUATIONS
Unsteady solution of the boundary layer equations with application to space shuttle tiles
[AD-A164105] N86-24727
DIFFERENTIAL CALCULUS
The bi-metric absolute differential calculus with applications to general relativity N86-25281
DIFFERENTIAL EQUATIONS
Stationary motions and incompressible limit for compressible viscous fluids
[AD-A163600] N86-24941
Dynamic and design sensitivity analysis of rigid and elastic mechanical systems with intermittent motion
[AD-A163982] N86-25025
Connecting mathematics, science and high technology: Research on solutions to nonlinear partial differential equations, bifurcation phenomena, and constructive methods for implementing the calculus of variations for relevant, physical problems
[AD-A162827] N86-25197
DIFFUSION
A Model of Airflow and Diffusion In Complex Terrain (MADICT)
[AD-A163819] N86-25083
Impurity diffusion in NiO grain boundaries
[AERE-R-11763] N86-25280
DIFFUSION COEFFICIENT
High resolution coherent anti-Stokes Raman spectroscopy of deuterium gas
[AD-A163946] N86-24779
DIFFUSION FLAMES
Mechanisms of combustion of hydrocarbon/alcohol fuel blends
[AD-A163737] N86-24776
Radical fluorescence studies with liquid propellants
[AD-A163472] N86-24857
DIGITAL COMPUTERS
Image segmentation using the military specification 1750A
[AD-A164180] N86-25138
DIGITAL DATA
Experiments with digitally mastered LaserVision optical discs
[BBC-RD-1986/1] N86-24976
Application of hierarchical data structures to geographical information systems
[AD-A163674] N86-25293
DIGITAL FILTERS
Time domain algorithms
[AD-A163054] N86-24895
Development of a Digital Interactive Controller Evaluation System (DICES)
[AD-A163966] N86-25164
DIGITAL SIMULATION
Multivariable control law design for enhanced air combat maneuvering. F-15/STOL (Short Take-Off and Landing) derivative fighter
[AD-A164017] N86-24706
Continuous representations of digital images
[AD-A164189] N86-25245
DIGITAL SYSTEMS
Colour encoding and decoding techniques for line-locked sampled PAL and NTSC television signals
[BBC-RD-1986/2] N86-24874
Interactive communication channel
[AD-D011968] N86-24893
Control circuitry for high speed VLSI (Very Large Scale Integration) winograd fourier transform processors
[AD-A164043] N86-24921
Design of a digital controller for an ultragravimetric microbalance
[AD-A164014] N86-24971
Optical disk technology for large scale mass storage
[AD-A163453] N86-25127
Parallel processing of region boundaries
[AD-A164112] N86-25157
Development of a Digital Interactive Controller Evaluation System (DICES)
[AD-A163966] N86-25164
DIGITAL TECHNIQUES
Colour encoding and decoding techniques for line-locked sampled PAL and NTSC television signals
[BBC-RD-1986/2] N86-24874
Continuous representations of digital images
[AD-A164189] N86-25245
DIMENSIONAL ANALYSIS
A dimensional analysis approach for characterizing pryotechnic mixture systems
[AD-A163018] N86-24863
Shifting the closed-loop spectrum in the optimal linear quadratic regulator problem for hereditary systems
[NASA-CR-178082] N86-25167
DIMERS
Energy transfer and photochemistry in biomimetic solar conversion
[PB86-142114] N86-25054
Dissociative electron attachment to rovibrationally excited molecules
[AD-A163065] N86-25228
DIODES
Optical feedback stabilization of laser diodes for passive resonance ring laser gyro applications
[AD-A163942] N86-24963
DIPHENYL COMPOUNDS
Poly(carbonate-mide) polymer
[NASA-CASE-LAR-13292-1] N86-24841
DIPOLE ANTENNAS
Algorithm definition for the VLSI design implementation of the electromagnetic radiation integral
[AD-A163825] N86-24888
DIRECT CURRENT
Simulation and performance of brushless dc motor actuators
[AD-A163725] N86-24913
Development of 3 and 5 kW fuel cell power plants
[AD-A163603] N86-25047
DIRECTIONAL CONTROL
Experimental assessment of vortex retaining cavity flaps for maneuverability improvement on delta wing fighter aircraft
[AD-A164104] N86-24690
DIRECTIONAL COUPLERS
Radio-frequency power delivery system: Procedures for error analysis and self-calibration
[PB86-115680] N86-24929
DIRECTORIES
Design and implementation of a centralized data directory for a distributed database management system
[AD-A163843] N86-25295
DISCRETE FUNCTIONS
Control circuitry for high speed VLSI (Very Large Scale Integration) winograd fourier transform processors
[AD-A164043] N86-24921
Architecture and numerical accuracy of high-speed DFT (Discrete Fourier Transform) processing systems
[AD-A163963] N86-25132
DISK GALAXIES
On stellar streaming motions in triaxial objects: The case of the galactic bulge N86-25308
DISPERSING
Silicon distribution in synthetic cast iron
[BLL-M-36680-(5828.4)] N86-24792
DISPLACEMENT
Question of application of method of finite elements to problems of deformation of incompressible media
[BLLD-5828.4-M-36665] N86-25012
Applications of wind empirical orthogonal functions in tropical cyclone motion studies
[AD-A164170] N86-25086
DISPLAY DEVICES
Theoretical and material studies on thin-film electroluminescent devices
[NASA-CR-176710] N86-24905
Flat-panel, full-color electroluminescent display
[NASA-CASE-LAR-13407-1] N86-24909
Laser ranging and video display system
[NASA-CASE-MSC-20870-1] N86-24977
An evaluation of color sets for CRT displays
[AD-A163894] N86-25125
A single board multiprocessor for real-time contour surface display generation
[AD-A163587] N86-25129
Pseudo-color display of laser radar imagery
[AD-A164213] N86-25246
Braille reading system
[NASA-CASE-LAR-13306-1] N86-25292
DISSOCIATION
Conductimetric determination of decomposition of silicate melts
[NASA-TM-88394] N86-24769
Competing unimolecular reactions of flame radicals. Part 1: Isomerization and dissociation of the methoxy radical
[AD-A164154] N86-24783
Dissociative electron attachment to rovibrationally excited molecules
[AD-A163065] N86-25228
DISTANCE
Gyro and accelerometer based navigation system for a mobile autonomous robot
[AD-A164036] N86-24882
A seawater battery monitor with fiber optic remote data acquisition capability
[AD-A164178] N86-25052
DISTRIBUTED FEEDBACK LASERS
Analysis of the gain-coupled distributed feedback laser as a source of short optical pulses N86-24987
DISTRIBUTED PROCESSING
The implementation and use of Ada on distributed systems with high reliability requirements
[NASA-CR-176760] N86-25142
Analysis of a distributed decision algorithm
[AD-A164181] N86-25159
Reasoning in real-time for the pilot associate: An examination of a model based approach to reasoning in real-time for artificial intelligence systems using a distributed architecture
[AD-A163947] N86-25171
Design and implementation of a centralized data directory for a distributed database management system
[AD-A163843] N86-25295
A network monitoring facility for a distributed data base management system
[AD-A164129] N86-25297
DISTRIBUTION (PROPERTY)
Robust estimation of the location parameter of life distributions
[AD-A163993] N86-25008
DISTRIBUTION FUNCTIONS
Robust estimation of the location parameter of life distributions
[AD-A163993] N86-25008
Modification of the ionospheric electron velocity distribution function due to resonant absorption of HF waves
[AD-A163025] N86-25073
Thermal barrier potential of a tandem mirror
[IPPJ-768] N86-25259
DIVING (UNDERWATER)
Test results for the 2.5-kVA ground fault protector
[AD-A163501] N86-24912
DOMAINS
Time domain referencing in intensity modulation fiber optic sensing systems
[NASA-CR-175109] N86-24691
Time domain algorithms
[AD-A163054] N86-24895
Joint services electronics program
[AD-A164151] N86-24924
Study of the effects of discretizing quantitative feedback theory analog control system designs
[AD-A164209] N86-25174
DONOR MATERIALS
Compensation in epitaxial cubic SiC films
[NASA-TM-87269] N86-25267
DOPED CRYSTALS
Study and analysis of AlGaAs/GaA modulation doped field-effect transistors incorporating p-type Schottky gate barriers
[AD-A164103] N86-24922
DROPS (LIQUIDS)
Optical studies of electrical discharge-liquid propellant interactions
[AD-A164156] N86-24784
Water jet/spray measurement analysis
[NASA-CR-178802] N86-24930
Characterization of simulated small-droplet fuel sprays
[NASA-TM-87286] N86-24961
The behavior of cloud droplets in an acoustic field: A numerical investigation
[AD-A163704] N86-25081
DUCTILITY
Heat treatment of tool joints for drill pipes
[BLLD-5828.4-M-36669] N86-24802
Influence of annealing temperature on ductile properties of steel wire
[BLL-M-36645-(5828.4)] N86-24810
Advanced processing and properties of high performance alloys
[AD-A163469] N86-24820
DUCTS
Experimental investigation of turbulent heat transfer in straight and curved rectangular ducts
[AD-A164142] N86-24950
Laser beam duct pressure controller system
[AD-D012017] N86-24984

DUPLEXERS
Interactive communication channel
[AD-D011968] N86-24893
DUST
Diagnostic study of atmosphere-terrain interaction leading to the formation of dust clouds and poor visibilities over the near east desert areas
[AD-A163890] N86-25085
DYE LASERS
CARS (Coherent Anti-Stokes Raman Scattering) spectroscopy of the reaction zone of methane-nitrous oxide and RDX propellant flames
[AD-A163465] N86-24773
High resolution coherent anti-Stokes Raman spectroscopy of deuterium gas
[AD-A163946] N86-24779
Laser probing and modification of MOCVD and VPE reactor kinetics
[AD-A163860] N86-24981
DYES
Laser probing and modification of MOCVD and VPE reactor kinetics
[AD-A163860] N86-24981
DYNAMIC CHARACTERISTICS
The development of vorticity and vortices from forced unsteady flow separation N86-24671
Review and evaluation of recent developments in melic inlet dynamic flow distortion prediction and computer program documentation and user's manual estimating maximum instantaneous inlet flow distortion from steady-state total pressure measurements with full, limited, or no dynamic data
[NASA-CR-176765] N86-24955
Dynamic and design sensitivity analysis of rigid and elastic mechanical systems with intermittent motion
[AD-A163982] N86-25025
Energy and chemical change
[AD-A164147] N86-25231
Numerical solutions of selected problems which arise in the theory of particle beams
[AD-A164041] N86-25235
DYNAMIC LOADS
The effect of energy dissipation due to friction at the joint of a simple beam structure
[AD-A163975] N86-24739
Behaviour of dynamically loaded pipes with circumferential flaws under internal pressure and external bending loads
[BLL-RISLEY-TR-5278-(9091.9F)] N86-25010
Behaviour of WB 35 pipe steel under dynamic loading in high-speed tensile tests
[BLL-RISLEY-TR-5279-(9091.9F)] N86-25011
DYNAMIC MODELS
A comprehensive model of the photophoretic force on a spherical microparticle
[AD-A163022] N86-24894
Burner liner thermal/structural load modeling: TRANCITS program user's manual
[NASA-CR-174891] N86-24931
DYNAMIC PRESSURE
A data base and analysis program for shuttle main engine dynamic pressure measurements
[NASA-CR-178808] N86-24750
DYNAMIC STABILITY
Adaptive control techniques for large space structures
[AD-A164240] N86-24742
Optical feedback stabilization of laser diodes for passive resonance ring laser gyro applications
[AD-A163942] N86-24983
DYNAMIC STRUCTURAL ANALYSIS
Advanced turboprop vibratory characteristics
[NASA-CR-174708] N86-24693
Burner liner thermal/structural load modeling: TRANCITS program user's manual
[NASA-CR-174891] N86-24931
Statistical correlation analysis for comparing vibration data from test and analysis
[NASA-TM-86081] N86-25018
DYNAMICAL SYSTEMS
Chaos in laser-matter interactions N86-24989

E

E REGION
Modification of the ionospheric electron velocity distribution function due to resonant absorption of HF waves
[AD-A163025] N86-25073
EARTH (PLANET)
Research and competition: Best partners
[NASA-TM-87313] N86-25321
EARTH OBSERVATIONS (FROM SPACE)
A definition study of an Advanced Data Collection and Location System (ADCLS)
[NASA-CR-177867] N86-25291
Research and technology, fiscal year 1985
[NASA-TM-88753] N86-25320
EARTH ORBITS
Nickel hydrogen battery cell testing data base: An industry and government survey
[AD-A163017] N86-25051
EARTH RESOURCES
Water resources data for New York, water year 1984. Volume 2: Long Island
[PB86-137338] N86-25037
Earth science investigations in the United States Antarctic Research Program (USARP) for the period July 1, 1984 - June 30, 1985
[PB86-143773] N86-25076
EARTH RESOURCES PROGRAM
Earth resources: A continuing bibliography with indexes (issue 49)
[NASA-SP-7041(49)] N86-25033
EARTHQUAKE RESISTANT STRUCTURES
Nonlinear earthquake analysis of concrete building structures
[AD-A163517] N86-25021
EARTHQUAKES
Nonlinear earthquake analysis of concrete building structures
[AD-A163517] N86-25021
ECLIPSING BINARY STARS
B and V photoelectric photometry and light curve solution of the interacting binary systems Hi Puppis,BI Eridani and Sy Horologii N86-25314
ECOLOGY
Outer Continental Shelf Environmental Assessment Program: Reports of principal investigators, volume 31
[PB86-134764] N86-25064
The ecology of irregularly flooded salt marshes of the northeastern Gulf of Mexico: A community profile
[TI86-900237] N86-25068
ECOSYSTEMS
Ducks Unlimited Joint Research Project
[NASA-TM-88755] N86-25032
Outer Continental Shelf Environmental Assessment Program: Reports of principal investigators, volume 31
[PB86-134764] N86-25064
Outer Continental Shelf Environment Assessment Program: Reports of principal investigators, volume 32
[PB86-134772] N86-25065
EDDY CURRENTS
Passive eddy-current damping as a means of vibration control in cryogenic turbomachinery
[NASA-TP-2562] N86-24722
EDUCATION
Education and computers: An AI (Artificial Intelligence) perspective
[AD-A163618] N86-25170
EFFICIENCY
Nonlinear analysis of efficiency enhancement in Ubitron/Free-Electron laser amplifiers
[AD-A163619] N86-24980
High efficiency pulse ultraviolet light source
[AD-D011965] N86-25243
EIGENVALUES
Eigenstructure assignment and its application in design of flight control systems
[NASA-TM-88411] N86-24701
Optimal quadratic asymptotic design approach and its applications
[NASA-TM-88389] N86-25177
EIGENVECTORS
Optimal quadratic asymptotic design approach and its applications
[NASA-TM-88389] N86-25177
EINSTEIN EQUATIONS
The bi-metric absolute differential calculus with applications to general relativity N86-25281
EL NINO
Forecast of Atlantic seasonal hurricane activity for 1986 N86-25080
ELASTIC BODIES
Dynamic and design sensitivity analysis of rigid and elastic mechanical systems with intermittent motion
[AD-A163982] N86-25025
ELASTIC DEFORMATION
Damage models for delamination and transverse fracture in fibrous composites
[AD-A164164] N86-24765
ELASTIC PROPERTIES
A mixture model for unidirectionally fiber-reinforced composites
[AD-A164136] N86-24764
On K-BKZ and other viscoelastic models as continuum generalization of the classical Spring-Dashpot models
[AD-A163703] N86-24943
Stress-strain behavior and failure uniaxial composites in combined compression and shear-2
[AD-A163477] N86-25020
FORTRAN program for vibration and sound radiation of spherical shell
[AD-A163752] N86-25022
ELASTIC SCATTERING
Nuclear structure studies by the scattering of medium-energy electrons
[DE86-002265] N86-25234
ELASTOMERS
Adhesion and the surface behavior of the silicone elastomer
[AD-A163815] N86-24851
ELECTRIC ARCS
Contribution to the study of the electric arc: Erosion of metallic electrodes
[NASA-TM-77855] N86-24816
ELECTRIC BATTERIES
A seawater battery monitor with fiber optic remote data acquisition capability
[AD-A164178] N86-25052
ELECTRIC CONNECTORS
A microcomputer-based menu-driven chip layout language
[AD-A164109] N86-24923
ELECTRIC CURRENT
Electromagnetic scattering from a slotted TM cylindrical conductor by the pseudo-image method
[AD-A163782] N86-24887
ELECTRIC FIELDS
Physical optics model of side lobe nulling by discs on a parabolic reflector
[AD-A163826] N86-24889
Set-up and demonstration of a Low Energy Electron Magnetometer (LEEM)
[NASA-CR-178091] N86-24963
Modification of the ionospheric electron velocity distribution function due to resonant absorption of HF waves
[AD-A163025] N86-25073
Quantum theory of ion motion and laser cooling in a radio frequency quadrupole trap
[AD-A163838] N86-25212
Method of measuring field funneling and range straggling in semiconductor charge-collecting junctions
[NASA-CASE-NPO-16584-1-CU] N86-25269
ELECTRIC POTENTIAL
Principles for system level electrochemistry
[NASA-TM-87283] N86-25039
Thin film technology of high-critical-temperature superconducting electronics
[AD-A136053] N86-25278
ELECTRIC POWER PLANTS
Advanced on-site power plant development technology program
[NASA-CR-174709] N86-25040
ELECTRIC POWER SUPPLIES
Space station 20-kHz power management and distribution system
[NASA-TM-87314] N86-24747
Performance and endurance tests of a multipropellant resistojet for space station auxiliary propulsion
[NASA-TM-87278] N86-24748
Development of 3 and 5 kW fuel cell power plants
[AD-A163603] N86-25047
ELECTRIC PROPULSION
Generation of free radicals and ions for spacecraft propulsion
[NASA-CR-176672] N86-24751
Laser thermal propulsion
[AD-A164163] N86-24753
ELECTRICAL FAULTS
Test results for the 2.5-kVA ground fault protector
[AD-A163501] N86-24912
ELECTRICAL MEASUREMENT
Apparatus for electrical measurements of thin films from 77 to 1000 K
[NASA-TM-87256] N86-24959
Predicting the effects of overloads on sustained-load crack growth in a high-temperature superalloy
[AD-A164018] N86-25026
ELECTRICAL PROPERTIES
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163559] N86-25273
ELECTRO-OPTICS
Theoretical and material studies on thin-film electroluminescent devices
[NASA-CR-176710] N86-24905
Adjustable mount for electro-optic transducers in an evacuated cryogenic system
[NASA-CASE-LAR-13100-1] N86-24993
ELECTROCHEMICAL CELLS
Principles for system level electrochemistry
[NASA-TM-87283] N86-25039

ELECTROCHEMISTRY
An improved closure of the Born-Green-Yvon equation for the electric double layer
[AD-A163452] N86-24772
Principles for system level electrochemistry
[NASA-TM-87283] N86-25039
ELECTRODEPOSITION
Long life nickel electrodes for a nickel-hydrogen cell: Cycle life tests
[NASA-CR-174815] N86-25046
ELECTRODES
Contribution to the study of the electric arc: Erosion of metallic electrodes
[NASA-TM-77855] N86-24816
Method of making a resonator having a desired frequency from a quartz crystal resonator plate
[AD-D012157] N86-24919
Long life nickel electrodes for a nickel-hydrogen cell: Cycle life tests
[NASA-CR-174815] N86-25046
Quantum theory of ion motion and laser cooling in a radio frequency quadrupole trap
[AD-A163838] N86-25212
Thin film technology of high-critical-temperature superconducting electronics
[AD-A136053] N86-25278
ELECTROLUMINESCENCE
Theoretical and material studies on thin-film electroluminescent devices
[NASA-CR-176710] N86-24905
Flat-panel, full-color electroluminescent display
[NASA-CASE-LAR-13407-1] N86-24909
ELECTROLYTES
An improved closure of the Born-Green-Yvon equation for the electric double layer
[AD-A163452] N86-24772
Advanced on-site power plant development technology program
[NASA-CR-174709] N86-25040
ELECTROMAGNETIC ABSORPTION
Modification of the ionospheric electron velocity distribution function due to resonant absorption of HF waves
[AD-A163025] N86-25073
Quantum mechanical atomic energy operator
[AD-A163839] N86-25226
ELECTROMAGNETIC FIELDS
Quantum mechanical atomic energy operator
[AD-A163839] N86-25226
ELECTROMAGNETIC INTERACTIONS
Induced Resonance Electron Cyclotron (IREC) quasi-optical maser
[AD-A164167] N86-24986
Comparison of absorption and radiation boundary conditions using a time-domain three-dimensional finite difference electromagnetic computer code
[AD-A163828] N86-25149
Laser interaction in long-scalelength plasmas
[AD-A163604] N86-25262
ELECTROMAGNETIC PROPERTIES
Measurement apparation and procedure for the determination of surface emissivities
[NASA-CASE-LAR-13455-1] N86-24880
Metrology for electromagnetic technology: A bibliography of NBS (National Bureau of Standards) publications
[PB86-130234] N86-24975
ELECTROMAGNETIC PULSES
Electromagnetic pulse: The fifth factor in the impact of a nuclear explosion
[AD-A163695] N86-24885
ELECTROMAGNETIC RADIATION
Method and apparatus for measuring distance
[NASA-CASE-MSC-20912-1] N86-24879
Algorithm definition for the VLSI design implementation of the electromagnetic radiation integral
[AD-A163825] N86-24888
Design methodology of an automated scattering measurement facility
[AD-A163896] N86-24891
A comprehensive model of the photophoretic force on a spherical microparticle
[AD-A163022] N86-24894
Technical evaluation report on the ElectromagneticWave Propagation Panel Symposium on Propagation Effects on Military Systems in the High Latitude Region
[AGARD-AR-218] N86-24903
Configuration study of new low-loss MM (Millimeter) wave guiding structures
[AD-A163784] N86-24914
Routing of high data rate signals using degenerate four wave mixing in BSO
[AD-A163746] N86-25240
Graphical study of electromagnetic wave accessibility in tokamak plasmas near the electron-cyclotron frequency
[INPE-3810-PRE/896] N86-25257
ELECTROMAGNETIC SCATTERING
Electromagnetic scattering from a slotted TM cylindrical conductor by the pseudo-image method
[AD-A163782] N86-24887
ELECTROMAGNETISM
Design methodology of an automated scattering measurement facility
[AD-A163896] N86-24891
Uniform transverse magnetic field inside a long cylinder
[AD-A163459] N86-25210
ELECTROMAGNETS
A method for fabricating magnetodielectric cores
[AD-A163457] N86-24911
ELECTROMOTIVE FORCES
The thermodynamic particulars of amorphous cobalt alloys
[BLLD-5828.4-M-36658] N86-24797
Study of phase distribution in unstable austenite steel using thermoelectromotive forces
[BLL-M-36644-(5828.4)] N86-24811
ELECTRON ATTACHMENT
Dissociative electron attachment to rovibrationally excited molecules
[AD-A163065] N86-25228
ELECTRON BEAMS
Microstructures of surface-melted alloys
[DE86-002916] N86-24819
Nonlinear analysis of efficiency enhancement in Ubitron/Free-Electron laser amplifiers
[AD-A163619] N86-24980
The axial injection TEM orbitron maser
[AD-A164166] N86-24985
ELECTRON CAPTURE
Studies of autoionizing states relevant to dielctronic recombination
[DE86-002908] N86-25264
ELECTRON CYCLOTRON HEATING
Tail anisotropy instability during plasma current rise by lower-hybrid waves in a tokamak
[IPPJ-756] N86-25251
Graphical study of electromagnetic wave accessibility in tokamak plasmas near the electron-cyclotron frequency
[INPE-3810-PRE/896] N86-25257
Thermal barrier potential of a tandem mirror
[IPPJ-768] N86-25259
Measurement of density fluctuations on the JIPP T-II tokamak plasma by millimeter and sub-millimeter wave scattering
[IPPJ-766] N86-25261
ELECTRON DENSITY (CONCENTRATION)
Thermal barrier potential of a tandem mirror
[IPPJ-768] N86-25259
ELECTRON DISTRIBUTION
Electron precipitation patterns in the vicinity of a VLF transmitter
[AD-A163716] N86-25072
ELECTRON ENERGY
Theoretical and material studies on thin-film electroluminescent devices
[NASA-CR-176710] N86-24905
ELECTRON MICROSCOPY
Transverse microsections of thin oxide scales for AEM studies
[AERE-R-11266] N86-24833
Electron microscopy observation of electrotransport
[AD-A164107] N86-25213
ELECTRON PLASMA
Tail anisotropy instability during plasma current rise by lower-hybrid waves in a tokamak
[IPPJ-756] N86-25251
ELECTRON PRECIPITATION
Electron precipitation patterns in the vicinity of a VLF transmitter
[AD-A163716] N86-25072
ELECTRON PUMPING
Studies on radiative collisional and ultraviolet lasers
[AD-A163901] N86-24982
ELECTRON SPECTROSCOPY
Electron precipitation patterns in the vicinity of a VLF transmitter
[AD-A163716] N86-25072
ELECTRON STATES
Competing unimolecular reactions of flame radicals. Part 1: Isomerization and dissociation of the methoxy radical
[AD-A164154] N86-24783
ELECTRON TRANSFER
Energy transfer and photochemistry in biomimetic solar conversion
[PB86-142114] N86-25054
Lectures on topics in magnetic reconnection and transport in fusion devices
[IPPJ-762] N86-25255
ELECTRON TUNNELING
The influence of a hot particle component on plasma stability
[IPPJ-755] N86-25256
Thin film technology of high-critical-temperature superconducting electronics
[AD-A136053] N86-25278
ELECTRONIC COUNTERMEASURES
Simulation of chaff cloud signature
[AD-A164106] N86-24898
Optimal estimation of target in clutter (CHAFF) from radar
[AD-A164200] N86-24901
ELECTRONIC EQUIPMENT
Optical studies of electrical discharge-liquid propellant interactions
[AD-A164156] N86-24784
Electromagnetic pulse: The fifth factor in the impact of a nuclear explosion
[AD-A163695] N86-24885
Dual mode heat exchanger
[AD-D012156] N86-24944
RADC (Rome Air Development Center) nonelectronic reliability notebook. Revision B
[AD-A163900] N86-25007
ELECTRONIC PACKAGING
Radiometric calibration procedures using the NBS (National Bureau of Standards) MARBLE electronics package
[PB86-129756] N86-24721
ELECTRONIC WARFARE
Introduction to the microcomputers for solving radar and electronic warfare problems
[AD-A164143] N86-25135
ELECTRONS
Metal cluster topology. Part 3: Platinum carbonyl clusters
[AD-A164241] N86-24830
Set-up and demonstration of a Low Energy Electron Magnetometer (LEEM)
[NASA-CR-178091] N86-24963
A solidary wave of a relativistic magnetosonic wave propagating perpendicularly to a magnetic field
[IPPJ-767] N86-25260
Laser interaction in long-scalelength plasmas
[AD-A163604] N86-25262
ELECTROSTATIC CHARGE
Set-up and demonstration of a Low Energy Electron Magnetometer (LEEM)
[NASA-CR-178091] N86-24963
ELECTROSTATICS
Modification of the ionospheric electron velocity distribution function due to resonant absorption of HF waves
[AD-A163025] N86-25073
Numerical solutions of selected problems which arise in the theory of particle beams
[AD-A164041] N86-25235
ELECTROTHERMAL ENGINES
Generation of free radicals and ions for spacecraft propulsion
[NASA-CR-176672] N86-24751
ELEVATION
Application of hierarchical data structures to geographical information systems
[AD-A163674] N86-25293
ELLIPSOIDS
Airborne bistatic radar limitations and sample calculations
[AD-A163941] N86-24892
ELLIPTICAL GALAXIES
Metallicity and the level of the ultraviolet rising branch in elliptical galaxies
[NASA-CR-176670] N86-25311
EMBEDDED COMPUTER SYSTEMS
Development of a run time math library for the 1750A airborne microcomputer
[AD-A163905] N86-25131
The implementation and use of Ada on distributed systems with high reliability requirements
[NASA-CR-176760] N86-25142
EMBRITTLEMENT
Thermokinetic diagram of embrittlement of maraging steel 03N18K9M5T-VD
[BLLD-5828.4-M-36648] N86-24807
ENCLOSURES
Frameless transparencies for aircraft cockpit enclosures
[AD-D012155] N86-24689
ENERGETIC PARTICLES
Set-up and demonstration of a Low Energy Electron Magnetometer (LEEM)
[NASA-CR-178091] N86-24963

ENERGY DISSIPATION
The effect of energy dissipation due to friction at the joint of a simple beam structure
[AD-A163975] N86-24739
Calibration of test systems for measuring power losses of transformers
[PB86-132032] N86-24928
ENERGY GAPS (SOLID STATE)
Analysis of optically controlled microwave/millimeter wave device structures
[NASA-TM-87246] N86-24907
ENERGY LEVELS
Laser probing and modification of MOCVD and VPE reactor kinetics
[AD-A163860] N86-24981
High temperature gas energy transfer
[AD-A163020] N86-25229
Theoretical investigation of point defects of mercury cadmium telluride A01
[AD-A163735] N86-25277
ENERGY SPECTRA
Abundances and energy spectra of high energy heavy cosmic-ray nuclei N86-25319
ENERGY STORAGE
Testimony of Fred R. Mynatt, Associate Director for Nuclear and Engineering Technologies, Oak Ridge National Laboratory, before the Subcommittee on Energy Research and Production of the Committee on Science and Technology, US House of Representatives
[DE86-002234] N86-25053
ENERGY TRANSFER
Radiation augmented propulsion feasibility
[AD-A163983] N86-24752
Determination of initial chemical steps in the gas-phase decomposition of energetic molecules
[AD-A163751] N86-24777
Competing unimolecular reactions of flame radicals. Part 1: Isomerization and dissociation of the methoxy radical
[AD-A164154] N86-24783
Radical fluorescence studies with liquid propellants
[AD-A163472] N86-24857
Nonlinear analysis of efficiency enhancement in Ubitron/Free-Electron laser amplifiers
[AD-A163619] N86-24980
Studies on radiative collisional and ultraviolet lasers
[AD-A163901] N86-24982
Energy transfer and photochemistry in biomimetic solar conversion
[PB86-142114] N86-25054
High temperature gas energy transfer
[AD-A163020] N86-25229
Vibrational energy transfer at a liquid gallium surface. Activation of unimolecular cyclobutene isomerization
[AD-A163023] N86-25230
A quantum mechanical investigation of vibrational energy transfer in O ((3)P) + H sub 2 O collisions
[AD-A164159] N86-25232
Laser interaction in long-scalelength plasmas
[AD-A163604] N86-25262
ENGINE INLETS
A numerical analysis applied to high angle of attack three-dimensional inlets
[NASA-TM-87298] N86-24658
ENGINES
Evaluation of Army engine oils in Hydraulic/Power transmission system components
[AD-A163527] N86-24847
ENGRAVING
Measurement of interior ballistic performance using FM/FM radio telemetry techniques
[AD-A164150] N86-24728
ENTHALPY
Journal of Research of the National Bureau of Standards, volume 90, number 4, July-August 1985
[PB86-137627] N86-24786
Enthalpies of mixing of alkaline-earth metals with iron and nickel
[BLLD-5828.4-M-36625] N86-24806
Enthalpies of formation of liquid three-component iron-cerium-aluminium alloys
[BLL-M-36623-(5828.4)] N86-25282
ENTROPY
Nonisentropic unsteady three dimensional small disturbance potential theory
[NASA-TM-87726] N86-24663
On the two-phase Stefan problem with interfacial energy and entropy
[AD-A163715] N86-25211
ENVIRONMENT EFFECTS
Comprehensive integrated remote sensing for US Department of Energy applications
[DE86-002101] N86-25036
ENVIRONMENTAL CHEMISTRY
Effects of seawater and deionized water at 0 to 80 deg C on the flexural properties of a glass/epoxy composite
[NASA-TM-86544] N86-24758
ENVIRONMENTAL MONITORING
Properties of 14Kh17N2 steel in corrosive environment
[BLL-M-36691-(5828.4)] N86-24794
Outer Continental Shelf Environmental Assessment Program. Reports of principal investigators, volume 33
[PB86-134780] N86-25061
Atmospheric modeling: Model and accuracy
[PB86-128683] N86-25062
ENZYMES
Multidisciplinary studies on excitatory amino acids as transmitters in the brain
[AD-A164258] N86-25115
EPITAXY
Floating emitter solar cell junction transistor
[NASA-CASE-NPO-16467-1-CU] N86-24908
Compensation in epitaxial cubic SiC films
[NASA-TM-87269] N86-25267
EPOXY MATRIX COMPOSITES
Effects of seawater and deionized water at 0 to 80 deg C on the flexural properties of a glass/epoxy composite
[NASA-TM-86544] N86-24758
EPOXY RESINS
Investigation of paramagnetic response of metallic epoxies
[NASA-CR-176551] N86-24761
The determination of the natural frequencies and mode shapes for anisotropic laminated plates including the effects of shear deformation and rotatory inertia
[AD-A164040] N86-24763
A mixture model for unidirectionally fiber-reinforced composites
[AD-A164136] N86-24764
EQUATIONS OF MOTION
Use of state estimation to calculate angle-of-attack position error from flight test data
[AD-A163962] N86-24670
A semi-analytic theory for satellite orbit prediction N86-24718
Near-inertial wave propagation in geostrophic shear N86-25108
Motion in the restricted problem of three bodies for small values of the mass parameter N86-25201
EQUIPMENT SPECIFICATIONS
Transverse microsections of thin oxide scales for AEM studies
[AERE-R-11266] N86-24833
EROSION
Contribution to the study of the electric arc: Erosion of metallic electrodes
[NASA-TM-77855] N86-24816
ACTA Armamentarii (selected articles)
[AD-A163713] N86-24861
Controlling nonpoint pollution in Virginia's urbanizing areas: An institutional perspective
[AD-A163693] N86-25057
EROSIVE BURNING
ACTA Armamentarii (selected articles)
[AD-A163713] N86-24861
ERROR ANALYSIS
The science of and advanced technology for cost-effective manufacture of high precision engineering products. Volume 4. Thermal effects on the accuracy of numerically controlled machine tool
[AD-A163598] N86-24871
Jamming effects on digital communication receivers (timing errors and frequency errors)
[AD-A164199] N86-24900
Radio-frequency power delivery system: Procedures for error analysis and self-calibration
[PB86-115680] N86-24929
Evaluation of NOGAPS 2.1 (Navy Operational Global Atmospheric Prediction System 2.1) systematic error - winter 1983 - 1984
[AD-A163812] N86-25082
ERROR CORRECTING CODES
Interactive communication channel
[AD-D011968] N86-24893
Architecture and numerical accuracy of high-speed DFT (Discrete Fourier Transform) processing systems
[AD-A163963] N86-25132
ERROR DETECTION CODES
Generalized parity relations for large space structures with uncertain parameters
[NASA-CR-176762] N86-24730
Analysis and design of a parameterized protocol converter
[AD-A164171] N86-25137
ERROR FUNCTIONS
Kalman filter design for the long range intercept function of the F-4E/G fire control system
[AD-A164205] N86-24926
ERRORS
Robust estimation of the location parameter of life distributions
[AD-A163993] N86-25008
Evaluation of NOGAPS 2.1 (Navy Operational Global Atmospheric Prediction System 2.1) systematic error - winter 1983 - 1984
[AD-A163812] N86-25082
ERYTHROCYTES
Review of modified hemoglobin solutions for use as temporary blood substitutes
[AD-A164210] N86-25114
ESTERS
A preliminary study of ester oxidation on an aluminum surface using chemiluminescence
[NASA-TM-87242] N86-24835
ESTIMATES
Robust estimation of the location parameter of life distributions
[AD-A163993] N86-25008
A comparison of estimation techniques for the three parameter Pareto distribution
[AD-A163831] N86-25192
A comparison of estimation techniques for the two parameter Cauchy distribution
[AD-A163833] N86-25205
Introduction to kernel density estimation
[AD-A163920] N86-25206
ESTIMATING
Characterization of the consistent weighted regression estimators
[AD-A163605] N86-25183
Bias and efficiency of the consistent weighted regression estimators in finite population sampling HC A03/MF A01
[AD-A163601] N86-25203
ETCHING
Method to reveal microstructures in single phase alloys
[AD-D012020] N86-24826
Method of making a resonator having a desired frequency from a quartz crystal resonator plate
[AD-D012157] N86-24919
Schottky barrier surface science
[AD-A163574] N86-25275
ETHYLENE
Fireproof hydraulic brake system
[AD-A163542] N86-24688
EULER EQUATIONS OF MOTION
Numerical solution of the Euler equations by implicit schemes with multiple grids N86-24655
Monte Carlo simulation of two-particle relative diffusion using Eulerian statistics: Extended abstract
[PB86-116548] N86-25077
EVALUATION
A real-time simulation evaluation of an advanced detection, isolation and accommodation algorithm for sensor failures in turbine engines
[NASA-TM-87289] N86-24697
Evaluation of Army engine oils in Hydraulic/Power transmission system components
[AD-A163527] N86-24847
Positron annihilation studies of very fine structured materials
[AD-A163822] N86-25225
Stirling Powered Van Progam overview
[NASA-TM-87227] N86-25303
EVAPORATION
Altitude ignition/lean decel study
[AD-A163052] N86-24781
Introduction to free atoms and particles
[AD-A163586] N86-25224
EXCIMER LASERS
Non-linear optical techniques for visible and UV lasers and thin film deposition
[AD-A164188] N86-24826
Studies on radiative collisional and ultraviolet lasers
[AD-A163901] N86-24982
EXCITATION
Laser probing and modification of MOCVD and VPE reactor kinetics
[AD-A163860] N86-24981
A quantum mechanical investigation of vibrational energy transfer in O ((3)P) + H sub 2 O collisions
[AD-A164159] N86-25232
Excitation anisotropy in laser-induced-fluorescence spectroscopy: Broad-line excitation case
[IPPJ-761] N86-25254
EXCITONS
Theoretical investigation of point defects of mercury cadmium telluride A01
[AD-A163735] N86-25277
EXHAUST EMISSION
Emissions from a light-duty diesel: Ambient temperature and fuel effects
[PB86-131349] N86-24865
EXHAUST NOZZLES
Propulsion and Energetics Panel Working Group 14 on suitable averaging techniques in non-uniform internal flows
[AD-A133968] N86-24692

EXHAUST VELOCITY
Estimation of ICBM (intercontinental ballistic missile) performance parameters
[AD-A164021] N86-24725
EXISTENCE
Remarks on the existence and uniqueness of unbounded viscosity solutions of Hamilton-Jacobi equations
[AD-A163701] N86-25189
EXOBIOLOGY
USSR Space Life Sciences Digest, issue 5
[NASA-CR-3922(05)] N86-25109
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 284)
[NASA-SP-7011(284)] N86-25111
EXPANDABLE STRUCTURES
Deployable geodesic truss structure A01
[NASA-CASE-LAR-13113-1] N86-24867
EXPERIMENTATION
Natural laminar flow flight experiments on a swept wing business jet-boundary layer stability analyses
[NASA-CR-3975] N86-24659
An experimental investigation of reducing advanced turboprop cabin noise by wing shielding
[NASA-TM-87112] N86-25218
EXPERT SYSTEMS
An engineering approach to the use of expert systems technology in avionics applications
[NASA-TM-88263] N86-24687
An application of adaptive learning to malfunction recovery
[NASA-CR-166620] N86-25169
EXPLOITATION
Detection and exploitation of vibration induced optical amplitude modulation
[AD-A164179] N86-25244
EXPLOSIVES
Determination of initial chemical steps in the gas-phase decomposition of energetic molecules
[AD-A163751] N86-24777
EXPONENTIAL FUNCTIONS
Robust estimation of the location parameter of life distributions
[AD-A163993] N86-25008
EXTERNAL TANKS
Ground vibration test of an F-16 airplane with modified decoupler pylons
[NASA-TM-87634] N86-24685
EXTINGUISHING
Altitude ignition/lean decel study
[AD-A163052] N86-24781
EXTREMUM VALUES
Tests for the extreme value and Weibull distributions based on normalized spacings
[AD-A163566] N86-25182
EYE PROTECTION
Compendium of protective eyewear
[PB86-135779] N86-25126

F

F REGION
Modification of the ionospheric electron velocity distribution function due to resonant absorption of HF waves
[AD-A163025] N86-25073
F-15 AIRCRAFT
Multivariable control law design for enhanced air combat maneuvering. F-15/STOL (Short Take-Off and Landing) derivative fighter
[AD-A164017] N86-24706
F-16 AIRCRAFT
Ground vibration test of an F-16 airplane with modified decoupler pylons
[NASA-TM-87634] N86-24685
F-108 AIRCRAFT
Lateral and longitudinal aerodynamic stability and control parameters of the basic vortex flap research aircraft as determined from flight test data
[NASA-TM-87711] N86-24703
FABRICATION
Designing a 25-kilowatt high frequency series resonant
[NASA-CR-176774] N86-24906
VMJ solar cell fabrication process using mask aligner
[AD-D011966] N86-25050
FABRY-PEROT INTERFEROMETERS
Combined fringe and Fabry-Perot laser anemometer for three component velocity measurements in turbine stator cascade facility
[NASA-TM-87322] N86-24967
FAILURE
Failure times in maintenance models
[AD-A163891] N86-25006
RADC (Rome Air Development Center) nonelectronic reliability notebook. Revision B
[AD-A163900] N86-25007
Robust estimation of the location parameter of life distributions
[AD-A163993] N86-25008
FAILURE ANALYSIS
The evaluation of the OSGLR algorithm for restructurable controls
[NASA-CR-178083] N86-24678
Generalized parity relations for large space structures with uncertain parameters
[NASA-CR-176762] N86-24730
Weather satellite costs have increased, problems have occurred in their manufacturing quality control
[PB86-131398] N86-24743
Three dimensional finite element analysis of failure in composite laminates N86-24768
FAILURE MODES
The evaluation of the OSGLR algorithm for restructurable controls
[NASA-CR-178083] N86-24678
A real-time simulation evaluation of an advanced detection, isolation and accommodation algorithm for sensor failures in turbine engines
[NASA-TM-87289] N86-24697
FAR FIELDS
Physical optics model of side lobe nulling by discs on a parabolic reflector
[AD-A163826] N86-24889
Prediction of the far field noise from wind energy farms
[NASA-CR-177956] N86-25215
Aircraft Noise Prediction Program theoretical manual: Propeller aerodynamics and noise
[NASA-TM-83199] N86-25220
FAR INFRARED RADIATION
Far infrared heterodyne detection with gallium doped germanium photoconductors
[AD-A163879] N86-25242
FAR ULTRAVIOLET RADIATION
Studies on radiative collisional and ultraviolet lasers
[AD-A163901] N86-24982
FARADAY EFFECT
Magnetic susceptibility of Fe-Cr-O alloys
[BLL-M-36643-(5828.4)] N86-24812
FAST FOURIER TRANSFORMATIONS
Wave attenuation in periodic structures N86-24873
FASTENERS
Fatigue rated fastener systems
[AGARD-R-721] N86-24994
FATIGUE (MATERIALS)
Thermal-mechanical fatigue behavior of nickel-base superalloys
[NASA-CR-175048] N86-24818
Constant-Load-Amplitude fatigue crack growth testing of cast aluminum alloys A201-T7 and A357-T6
[AD-A163494] N86-24821
Crack healing in polymers
[AD-A164130] N86-24856
Fatigue rated fastener systems
[AGARD-R-721] N86-24994
FATIGUE LIFE
Cracking resistance in a 4.5-inch (114-mm) plate of 7075-T7351 aluminum alloy
[AD-A164229] N86-24829
FATIGUE TESTS
Fatigue rated fastener systems
[AGARD-R-721] N86-24994
FAULT TOLERANCE
Architecture and numerical accuracy of high-speed DFT (Discrete Fourier Transform) processing systems
[AD-A163963] N86-25132
The implementation and use of Ada on distributed systems with high reliability requirements
[NASA-CR-176760] N86-25142
FEEDBACK
Optical feedback stabilization of laser diodes for passive resonance ring laser gyro applications
[AD-A163942] N86-24983
FEEDBACK CONTROL
A research program in active control/aeroelasticity
[NASA-CR-176773] N86-24702
Multivariable control law design for enhanced air combat maneuvering. F-15/STOL (Short Take-Off and Landing) derivative fighter
[AD-A164017] N86-24706
An LQG up-and away flight control design for the STOL F-15 aircraft
[AD-A164108] N86-24707
The detumbling of an axially symmetric satellite with an orbital maneuvering vehicle by nonlinear feedback control
[AD-A163989] N86-24717
Stability of spinning ICBM (intercontinental ballistic missile) in first stage boost phase
[AD-A164019] N86-24724
Control of a large space structure using direct output feedback and modal suppression
[AD-A163960] N86-24738
Analysis of the gain-coupled distributed feedback laser as a source of short optical pulses N86-24987
Development of a Digital Interactive Controller Evaluation System (DICES)
[AD-A163966] N86-25164
Shifting the closed-loop spectrum in the optimal linear quadratic regulator problem for hereditary systems
[NASA-CR-178082] N86-25167
Study of the effects of discretizing quantitative feedback theory analog control system designs
[AD-A164209] N86-25174
Real-time adaptive control of a robotic manipulator using three-dimensional stereoscopic vision feedback N86-25175
Optimal quadratic asymptotic design approach and its applications
[NASA-TM-88389] N86-25177
FEET (ANATOMY)
The design, fabrication and delivery of a manipulator foot restraint mockup for space telescope development testing
[NASA-CR-178837] N86-25121
FERRITES
Abrasion and deformed layer formation of manganese-zinc ferrite in sliding contact with lapping tapes
[NASA-TM-87249] N86-24838
Unified matrices for electronic computers
[AD-A163689] N86-25130
FERRITIC STAINLESS STEELS
Behaviour of dynamically loaded pipes with circumferential flaws under internal pressure and external bending loads
[BLL-RISLEY-TR-5278-(9091.9F)] N86-25010
Behaviour of WB 35 pipe steel under dynamic loading in high-speed tensile tests
[BLL-RISLEY-TR-5279-(9091.9F)] N86-25011
FERROMAGNETIC MATERIALS
Advanced artificial dielectric materials for millimeter wavelength applications. Part A
[AD-A164195] N86-24925
FIBER OPTICS
Time domain referencing in intensity modulation fiber optic sensing systems
[NASA-CR-175109] N86-24691
A gated microchannel plate image intensifier packaged in a reflex camera back
[AD-A163015] N86-24970
Microlens system formed on the end of a single mode fiber for laser applications N86-24988
A seawater battery monitor with fiber optic remote data acquisition capability
[AD-A164178] N86-25052
Optical star coupler with large number of inputs and outputs
[NASA-TM-88395] N86-25237
Parallel image transmission through a single optical fiber
[AD-A163809] N86-25241
FIBER REINFORCED COMPOSITES
A unique set of micromechanics equations for high temperature metal matrix composites
[NASA-TM-87154] N86-24757
Damping characteristics of metal matrix composites
[AD-A163569] N86-24762
A mixture model for unidirectionally fiber-reinforced composites
[AD-A164136] N86-24764
Stress waves in transversely isotropic media: The homogeneous problem
[NASA-CR-3977] N86-25002
FIBER STRENGTH
Damping characteristics of metal matrix composites
[AD-A163569] N86-24762
FIELD STRENGTH
Research in particles and fields
[NASA-CR-176763] N86-25017
FIELD THEORY (ALGEBRA)
Mechanics of field-consistency in finite element analysis: A penalty function approach
[NAL-TM-ST-8514] N86-25180
FIELD THEORY (PHYSICS)
The bi-metric absolute differential calculus with applications to general relativity N86-25281
FIGHTER AIRCRAFT
Experimental assessment of vortex retaining cavity flaps for maneuverability improvement on delta wing fighter aircraft
[AD-A164104] N86-24690

An LQG up-and away flight control design for the STOL F-15 aircraft
[AD-A164108] N86-24707

FINANCIAL MANAGEMENT
NASA's FIA (National Aeronautics and Space Administration's Financial Integrity Act) Program: NASA's progress in implementing Financial Integrity Act requirements
[PB86-135100] N86-25288

FINITE DIFFERENCE THEORY
Flat plate and turbine vane cascade heat transfer investigation using a shock tube
[AD-A163992] N86-24947
Adaptive-grid optimization for minimizing steady-state, truncation error
[AD-A164038] N86-24948
Comparison of absorption and radiation boundary conditions using a time-domain three-dimensional finite difference electromagnetic computer code
[AD-A163828] N86-25149
Numerical solutions of selected problems which arise in the theory of particle beams
[AD-A164041] N86-25235

FINITE ELEMENT METHOD
Structural optimization by generalized, multilevel decomposition
[NASA-TM-87605] N86-24686
Analysis of the stress state in an Iosipescu shear test specimen
[NASA-CR-176745] N86-24755
A unique set of micromechanics equations for high temperature metal matrix composites
[NASA-TM-87154] N86-24757
Damage models for delamination and transverse fracture in fibrous composites
[AD-A164164] N86-24765
Three dimensional finite element analysis of failure in composite laminates N86-24768
Improved numerical implementation of the bounding surface plasticity model for cohesive soils
[AD-A163572] N86-24870
Question of application of method of finite elements to problems of deformation of incompressible media
[BLLD-5828.4-M-36665] N86-25012
The buckling of composite cylindrical panels considering environmental effects
[AD-A163878] N86-25024
A computational model for contact stress problems AD-A164190
[AD-A164190] N86-25027
CADS: A Computer Aided Design System, volume 1
[AD-A163556] N86-25147
Mechanics of field-consistency in finite element analysis: A penalty function approach
[NAL-TM-ST-8514] N86-25180
Bias and efficiency of the consistent weighted regression estimators in finite population sampling HC A03/MF A01
[AD-A163601] N86-25203

FINS
Numerical flow field calculations for a missile configuration at M = .6
[AD-A164155] N86-24951

FIRE CONTROL
Preliminary kalman filter design to improve air combat maneuvering target estimation for the F-4E/G fire control system
[AD-A164034] N86-25200

FIRE PREVENTION
Fireproof hydraulic brake system
[AD-A163542] N86-24688

FIRES
Data sources for parameters used in predictive modeling of fire growth and smoke spread
[PB86-130986] N86-24788
Fire resistant fuel program analysis and program management documentation
[AD-A163724] N86-24862
Heat transfer in compartment fires near regions of ceiling jet-wall impingement N86-24866

FISHES
Outer Continental Shelf Environment Assessment Program: Reports of principal investigators, volume 32
[PB86-134772] N86-25065

FIXED WINGS
Cost estimating relationships for fixed wing aircraft: List price versus empty weight
[AD-A164196] N86-25300

FLAME HOLDERS
Technical notes on orifice tests
[AD-A164227] N86-24952

FLAME PROBES
Non-perturbing beam deflection system and method for high repetition rate temperature measurement of combustion flames
[AD-D012154] N86-24780

FLAME RETARDANTS
Fireproof hydraulic brake system
[AD-A163542] N86-24688

FLAME TEMPERATURE
CARS (Coherent Anti-Stokes Raman Scattering) spectroscopy of the reaction zone of methane-nitrous oxide and RDX propellant flames
[AD-A163465] N86-24773

FLAMES
Convective heating of energetic materials
[AD-A163919] N86-24778
Non-perturbing beam deflection system and method for high repetition rate temperature measurement of combustion flames
[AD-D012154] N86-24780
Competing unimolecular reactions of flame radicals. Part 1: Isomerization and dissociation of the methoxy radical
[AD-A164154] N86-24783

FLAT PLATES
Unsteady solution of the boundary layer equations with application to space shuttle tiles
[AD-A164105] N86-24727
Flat plate and turbine vane cascade heat transfer investigation using a shock tube
[AD-A163992] N86-24947
Adaptive-grid optimization for minimizing steady-state, truncation error
[AD-A164038] N86-24948
Silicon production in a fluidized bed reactor
[JPL-PUBL-86-17] N86-25043

FLEXIBLE BODIES
Control of a large space structure using direct output feedback and modal suppression
[AD-A163960] N86-24738
Mathematical correlation of modal parameter identification methods via system realization theory
[NASA-TM-87720] N86-25019
Dynamic and design sensitivity analysis of rigid and elastic mechanical systems with intermittent motion
[AD-A163982] N86-25025

FLEXIBLE SPACECRAFT
Moving-bank multiple model adaptive algorithms applied to flexible spacecraft control
[AD-A164016] N86-24740
Mathematical correlation of modal parameter identification methods via system realization theory
[NASA-TM-87720] N86-25019

FLEXING
Effects of seawater and deionized water at 0 to 80 deg C on the flexural properties of a glass/epoxy composite
[NASA-TM-86544] N86-24758

FLIGHT CHARACTERISTICS
Loads and motions of an F-106B flying through thunderstorms
[NASA-TM-87671] N86-24672
Space Shuttle flying qualities criteria assessment. Phase 5: Data acquisition and analysis
[NASA-CR-166618] N86-24704

FLIGHT CONDITIONS
Aircraft accident/incident summary reports: Denver, Colorado, August 19, 1983; Blountville, Tennessee, July 16, 1983; Tucson, Arizona, February 6, 1983, Cockeysville, Maryland, April 26, 1984; Akron, Ohio, September 30, 1984; Seattle, Washington, October 18, 1984; Miami, Florida, November 11, 1983
[PB85-910409] N86-24675

FLIGHT CONTROL
Aircraft accident/incident summary reports: Denver, Colorado, August 19, 1983; Blountville, Tennessee, July 16, 1983; Tucson, Arizona, February 6, 1983, Cockeysville, Maryland, April 26, 1984; Akron, Ohio, September 30, 1984; Seattle, Washington, October 18, 1984; Miami, Florida, November 11, 1983
[PB85-910409] N86-24675
Eigenstructure assignment and its application in design of flight control systems
[NASA-TM-86411] N86-24701
Space Shuttle flying qualities criteria assessment. Phase 5: Data acquisition and analysis
[NASA-CR-166618] N86-24704
An LQG up-and away flight control design for the STOL F-15 aircraft
[AD-A164108] N86-24707
An empirical study of flight control software reliability
[NASA-CR-178058] N86-25145
An application of adaptive learning to malfunction recovery
[NASA-CR-166620] N86-25169
Study of the effects of discretizing quantitative feedback theory analog control system designs
[AD-A164209] N86-25174

FLIGHT CREWS
Behavioral considerations for space station design
[AD-A163478] N86-25118
Leadership on the flight deck: The influence of crew social relations and crew member experience on leadership style effectiveness in civil aviation flight crews
[CAR-8612] N86-25286

FLIGHT HAZARDS
Application of artificial intelligence to improve aircraft survivability
[AD-A164172] N86-24674

FLIGHT PATHS
Pressure based separation in the upper airspace
[CAR-8614] N86-24679

FLIGHT SAFETY
Pressure based separation in the upper airspace
[CAR-8614] N86-24679

FLIGHT SIMULATION
Lateral and longitudinal aerodynamic stability and control parameters of the basic vortex flap research aircraft as determined from flight test data
[NASA-TM-87711] N86-24703
Theoretical three-and four-axis gimbal robot wrists
[NASA-TP-2564] N86-25168

FLIGHT STABILITY TESTS
Lateral and longitudinal aerodynamic stability and control parameters of the basic vortex flap research aircraft as determined from flight test data
[NASA-TM-87711] N86-24703

FLIGHT TEST VEHICLES
Use of state estimation to calculate angle-of-attack position error from flight test data
[AD-A163962] N86-24670

FLIGHT TESTS
Natural laminar flow flight experiments on a swept wing business jet-boundary layer stability analyses
[NASA-CR-3975] N86-24659
Computed centerline MLS (Microwave Landing System) approach demonstration at Washington National Airport
[AD-A163722] N86-24661
Fireproof hydraulic brake system
[AD-A163542] N86-24688
Real-time flight test PCM data acquisition monitor
[AD-A164035] N86-24897

FLIR DETECTORS
Characteristics of Bayesian multiple model adaptive estimation for tracking airborne targets
[AD-A163830] N86-24890

FLOAT ZONES
Floating emitter solar cell junction transistor
[NASA-CASE-NPO-16467-1-CU] N86-24908

FLOATING
Image segmentation using the military specification 1750A
[AD-A164180] N86-25138

FLOW DISTORTION
Statistical prediction of dynamic distortion of inlet flow using minimum dynamic measurement. An application to the Melick statistical method and inlet flow dynamic distortion prediction without RMS measurements
[NASA-CR-176764] N86-24933
Review and evaluation of recent developments in melic inlet dynamic flow distortion prediction and computer program documentation and user's manual estimating maximum instantaneous inlet flow distortion from steady-state total pressure measurements with full, limited, or no dynamic data
[NASA-CR-176765] N86-24955

FLOW DISTRIBUTION
Nonisentropic unsteady three dimensional small disturbance potential theory
[NASA-TM-87726] N86-24683
Propulsion and Energetics Panel Working Group 14 on suitable averaging techniques in non-uniform internal flows
[AD-A133968] N86-24692
Statistical prediction of dynamic distortion of inlet flow using minimum dynamic measurement. An application to the Melick statistical method and inlet flow dynamic distortion prediction without RMS measurements
[NASA-CR-176764] N86-24933
An experimental study of clustered nozzles with variable shrouds
[AD-A163961] N86-24945
A schlieren and hot-wire investigation of karman vortex streets
[AD-A164101] N86-24949
Numerical flow field calculations for a missile configuration at M = .6
[AD-A164155] N86-24951
Near-inertial wave propagation in geostrophic shear N86-25108

FLOW GEOMETRY
On stratification and wind-induced mixing in the Chesapeake Bay N86-25107

FLOW MEASUREMENT
Dual mode laser velocimeter
[NASA-CASE-ARC-11634-1] N86-24978

Current variability near the southeast Newfoundland ridge
[AD-A163644] N86-25102

FLOW VELOCITY
Dilution jet mixing program, phase 3
[NASA-CR-174884] N86-24938
Technical notes on orifice tests
[AD-A164227] N86-24952

FLOW VISUALIZATION
Vapor-screen flow-visualization experiments in the NASA Langley 0.3-m transonic cryogenic tunnel
[NASA-CR-3984] N86-24861
Two-dimensional confined jet thrust vector control with flow visualization and variable flow geometry
[AD-A164214] N86-24899
Experimental study of apex fences for lift enhancement on a highly swept delta wing configuration
[AD-A163877] N86-24705
An experimental study of clustered nozzles with variable shrouds
[AD-A163961] N86-24945
A schlieren and hot-wire investigation of karman vortex streets
[AD-A164101] N86-24949
Beam-modulation methods in quantitative and flow visualization holographic interferometry
[NASA-TM-87306] N86-24958

FLUE GASES
Removal of sulfur and nitrogen containing pollutants from discharge gases
[DE85-017799] N86-25058

FLUID DYNAMICS
A computational study of multiple jet and wall interaction
[NASA-TM-86541] N86-24937
Dilution jet mixing program, phase 3
[NASA-CR-174884] N86-24938
Flat plate and turbine vane cascade heat transfer investigation using a shock tube
[AD-A163992] N86-24947
AGARD Bulletin: Meetings, publications, membership
[AGARD-BULL-86/1] N86-25285

FLUID FILMS
Studies of vertical annular gas-liquid flows
N86-24956

FLUID FILTERS
Estimation of ICBM (intercontinental ballistic missile) performance parameters
[AD-A164021] N86-24725

FLUID MECHANICS
Dynamically supported geoid highs over hotspots: Observation and theory
[NASA-CR-176766] N86-25069
Numerical grid generation for parabolic partial differential equations using marching techniques
[AD-A164020] N86-25198

FLUID POWER
Evaluation of Army engine oils in Hydraulic/Power transmission system components
[AD-A163527] N86-24847

FLUORESCENCE
Radical fluorescence studies with liquid propellants
[AD-A163472] N86-24857

FLUORO COMPOUNDS
Process for producing an electrode membrane unit for hydrogen/bromine cells
[NASA-TM-88396] N86-25041

FLUTTER
Ground vibration test of an F-16 airplane with modified decoupler pylons
[NASA-TM-87634] N86-24685

FLUX (RATE)
Metallicity and the level of the ultraviolet rising branch in elliptical galaxies
[NASA-CR-176670] N86-25311

FLUX QUANTIZATION
Superconducting quantum devices, summary and conclusions
[DE86-001578] N86-25283

FLY ASH
Removal of sulfur and nitrogen containing pollutants from discharge gases
[DE85-017799] N86-25058

FLYWHEELS
Evaluation of a double Gimbal IPACS design
[NASA-CR-178040] N86-24745

FOAMING
Lubricant foaming and aeration study, part 2
[AD-A163696] N86-24849

FOCUSING
Laser thermal propulsion
[AD-A164163] N86-24753
Dual mode laser velocimeter
[NASA-CASE-ARC-11634-1] N86-24978
Microlens system formed on the end of a single mode fiber for laser applications N86-24988

Electron precipitation patterns in the vicinity of a VLF transmitter
[AD-A163716] N86-25072

FOG
The behavior of cloud droplets in an acoustic field: A numerical investigation
[AD-A163704] N86-25081
Diagnostic study of atmosphere-terrain interaction leading to the formation of dust clouds and poor visibilities over the near east desert areas
[AD-A163890] N86-25085

FOILS (MATERIALS)
Diffusion oxygen barrier coating A02/MF A01
[NASA-CASE-LAR-13474-1-SB] N86-24814

FOKKER-PLANCK EQUATION
Tail anisotropy instability during plasma current rise by lower-hybrid waves in a tokamak
[IPPJ-756] N86-25251
Energy confinement studies of lower hybrid current driven discharges in the Alcator C tokamak
[DE85-014754] N86-25263

FOLDING STRUCTURES
Shuttle-launch triangular space station
[NASA-CASE-10676-1] N86-24729
Deployable geodesic truss structure A01
[NASA-CASE-LAR-13113-1] N86-24867

FORCED CONVECTION
Effect of forced convection heat transfer on weld pools
[AD-A163970] N86-24998

FOREIGN POLICY
Science policy study. Volume 7: International cooperation in science
[GPO-52-283] N86-25301

FOREST FIRE DETECTION
Conceptual design study: Forest Fire Advanced System Technology (FFAST)
[JPL-PUBL-86-5] N86-25034

FOREST FIRES
Conceptual design study: Forest Fire Advanced System Technology (FFAST)
[JPL-PUBL-86-5] N86-25034

FORMAT
Combining and connecting linear, multi-input, multi-output subsystem models
[NASA-TM-85912] N86-25166

FORMULAS (MATHEMATICS)
FORTRAN program for vibration and sound radiation of spherical shell
[AD-A163752] N86-25022
Bias and efficiency of the consistent weighted regression estimators in finite population sampling HC A03/MF A01
[AD-A163601] N86-25203

FORTRAN
FORTRAN program for vibration and sound radiation of spherical shell
[AD-A163752] N86-25022

FOURIER TRANSFORMATION
Arithmetic circuitry for high speed VLSI Winograd Fourier transform processor
[AD-A163943] N86-24917
Control circuitry for high speed VLSI (Very Large Scale Integration) winograd fourier transform processors
[AD-A164043] N86-24921
Architecture and numerical accuracy of high-speed DFT (Discrete Fourier Transform) processing systems
[AD-A163963] N86-25132
Data analysis on the rotor test stand program for interactive processing
[NASA-TM-77948] N86-25146
Computer model of a passive synthetic aperture imaging system
[AD-A164144] N86-25158

FRACTIONATION
Laser thermal propulsion
[AD-A164163] N86-24753

FRACTURE MECHANICS
Advanced processing and properties of high performance alloys
[AD-A163469] N86-24820
Constant-Load-Amplitude fatigue crack growth testing of cast aluminum alloys A201-T7 and A357-T6
[AD-A163494] N86-24821
Crack healing in polymers
[AD-A164130] N86-24856
Behaviour of dynamically loaded pipes with circumferential flaws under internal pressure and external bending loads
[BLL-RISLEY-TR-5278-(9091.9F)] N86-25010
Some advances in fracture studies under the Heavy-Section Steel Technology Program
[TI85-018096] N86-25029

FRACTURE STRENGTH
Cracking resistance in a 4.5-inch (114-mm) plate of 7075-T7351 aluminum alloy
[AD-A164229] N86-24829

Joining of ceramics for advanced heavy-duty diesels
[NASA-CR-175019] N86-24846
Determination of main strength properties of 9KhF roll steel
[BLL-M-36651-(5828.4)] N86-25014

FRACTURING
Damage models for delamination and transverse fracture in fibrous composites
[AD-A164164] N86-24765

FRANCE
The long-range shelling of Paris and physical chemistry problems of extremely long-range firing
[NASA-TM-88416] N86-24868

FREE ELECTRON LASERS
Nonlinear analysis of efficiency enhancement in Ubitron/Free-Electron laser amplifiers
[AD-A163619] N86-24980

FREE RADICALS
Generation of free radicals and ions for spacecraft propulsion
[NASA-CR-176672] N86-24751
Introduction to free atoms and particles
[AD-A163586] N86-25224

FREEZING
On the two-phase Stefan problem with interfacial energy and entropy
[AD-A163715] N86-25211

FREQUENCIES
Reciprocity calibration in a plane wave resonator
[AD-A164149] N86-24972
A seawater battery monitor with fiber optic remote data acquisition capability
[AD-A164178] N86-25052

FREQUENCY ASSIGNMENT
Impact of the 1985 Space World Administrative Radio Conference on frequency/orbit planning and use
[NASA-TM-87285] N86-24881

FREQUENCY DISTRIBUTION
Diagnostic study of atmosphere-terrain interaction leading to the formation of dust clouds and poor visibilities over the near east desert areas
[AD-A163890] N86-25085

FREQUENCY HOPPING
Effects of convergence zone multipath on crosscorrelation
[AD-A163650] N86-25221

FREQUENCY MEASUREMENT
Thermoviscoplastic nonlinear constitutive relationships for structural analysis of high temperature metal matrix composites
[NASA-TM-87291] N86-24756

FREQUENCY MODULATION
Measurement of interior ballistic performance using FM/FM radio telemetry techniques
[AD-A164150] N86-24726
Jamming effects on digital communication receivers (timing errors and frequency errors)
[AD-A164199] N86-24900

FREQUENCY SHIFT
High resolution coherent anti-Stokes Raman spectroscopy of deuterium gas
[AD-A163946] N86-24779

FREQUENCY STABILITY
The effect of energy dissipation due to friction at the joint of a simple beam structure
[AD-A163975] N86-24739
Optical feedback stabilization of laser diodes for passive resonance ring laser gyro applications
[AD-A163942] N86-24983

FRICTION
The effect of energy dissipation due to friction at the joint of a simple beam structure
[AD-A163975] N86-24739

FROUDE NUMBER
A one-level mesoscale model for diagnosing surface winds in mountainous and coastal regions N86-25097

FUEL CELL POWER PLANTS
Development of 3 and 5 kW fuel cell power plants
[AD-A163603] N86-25047
Development of partial oxidizer/reformer for PAFC power plants
[AD-A163781] N86-25049

FUEL CELLS
Advanced on-site power plant development technology program
[NASA-CR-174709] N86-25040

FUEL COMBUSTION
Mechanisms of combustion of hydrocarbon/alcohol fuel blends
[AD-A163737] N86-24776

FUEL CONSUMPTION
Emissions from a light-duty diesel: Ambient temperature and fuel effects
[PB86-131349] N86-24865

FUEL SPRAYS
Characterization of simulated small-droplet fuel sprays
[NASA-TM-87286] N86-24961
FUEL TESTS
Development of a test method to determine potential peroxide content in turbine fuels
[AD-A163590] N86-24858
FUEL-AIR RATIO
Altitude ignition/lean decel study
[AD-A163052] N86-24781
FUELS
Fire resistant fuel program analysis and program management documentation
[AD-A163724] N86-24862
FUNCTIONAL ANALYSIS
Moving-bank multiple model adaptive algorithms applied to flexible spacecraft control
[AD-A164016] N86-24740
FUNCTIONS (MATHEMATICS)
Improved interval bounds for ranges of functions
[AD-A163627] N86-25187
FUNGI
Fungi and hydrocarbons in the marine environment
[PB86-109964] N86-25066
FURNACES
Aerodynamic characteristics of gas cushion for cylinders
[BLL-M-36671-(5828.4)] N86-24656
FUSELAGES
Unsteady transonic flow calculations for wing-fuselage configurations
[NASA-TM-87707] N86-24857
Experimental assessment of vortex retaining cavity flaps for maneuverability improvement on delta wing fighter aircraft
[AD-A164104] N86-24690
FUSION REACTORS
Static and dynamic tensile tests on wide X 6 CrNi 18 11 steel plates to demonstrate the integrity of the reactor tank for the SNR 300 fast sodium-cooled reactor
[BLL-RISLEY-TR-5280-(9091.9F)] N86-25009
Volume produced H(-), D(-) ion source for proton accelerator and thermo-nuclear fusion research by sheet plasma (1)
[IPPJ-760] N86-25253
FUZZY SETS
A fuzzy set approach to vulnerability analysis AD-A163921 BRL-TR-2697 HC A03/MF A01
[AD-A163921] N86-25196

G

GALACTIC ROTATION
On stellar streaming motions in triaxial objects: The case of the galactic bulge N86-25308
GALLIUM
Vibrational energy transfer at a liquid gallium surface. Activation of unimolecular cyclobutene isomerization
[AD-A163023] N86-25230
GALLIUM ARSENIDES
Overlayer-induced enhanced oxidation of GaAs surfaces
[AD-A163450] N86-25270
Isolation and characterization of an organogallium-arsenic cluster: Crystal structure of ((PhAsH)(R2Ga)(PhAs)6(RGa)4)(R=Me3SiCH2)
[AD-A163485] N86-25271
A characterization of the chemical vapor deposition of gallium arsenide and indium phosphide in the hydride and chloride systems
[AD-A164259] N86-25279
GAMMA RAY SPECTRA
Gamma-ray background induced in a double Ge(Li) spectrometer at balloon altitudes in the hemisphere
[INPE-3797-PRE/892] N86-25317
GAMMA RAY SPECTROMETERS
Improved detector for the measurement of gamma radiation
[PB86-106945] N86-24974
Gamma-ray background induced in a double Ge(Li) spectrometer at balloon altitudes in the hemisphere
[INPE-3797-PRE/892] N86-25317
GAMMA RAY TELESCOPES
Gamma-ray background induced in a double Ge(Li) spectrometer at balloon altitudes in the hemisphere
[INPE-3797-PRE/892] N86-25317
GAMMA RAYS
Electromagnetic pulse: The fifth factor in the impact of a nuclear explosion
[AD-A163695] N86-24885
Research in particles and fields
[NASA-CR-176763] N86-25017
GAS CHROMATOGRAPHY
Determination of initial chemical steps in the gas-phase decomposition of energetic molecules
[AD-A163751] N86-24777
GAS COOLING
Effect of forced convection heat transfer on weld pools
[AD-A163970] N86-24998
GAS DYNAMICS
A comprehensive model of the photophoretic force on a spherical microparticle
[AD-A163022] N86-24894
An experimental study of clustered nozzles with variable shrouds
[AD-A163961] N86-24945
GAS FLOW
Studies of vertical annular gas-liquid flows N86-24956
Laser beam duct pressure controller system
[AD-D012017] N86-24984
GAS GENERATORS
Development of 3 and 5 kW fuel cell power plants
[AD-A163603] N86-25047
GAS MIXTURES
Radiation augmented propulsion feasibility
[AD-A163983] N86-24752
Measurement of viscosity of gaseous mixtures at atmospheric pressure
[NASA-TP-2582] N86-24962
GAS PRESSURE
Measurement of interior ballistic performance using FM/FM radio telemetry techniques
[AD-A164150] N86-24728
GAS TEMPERATURE
CARS (Coherent Anti-Stokes Raman Scattering) spectroscopy of the reaction zone of methane-nitrous oxide and RDX propellant flames
[AD-A163465] N86-24773
Non-perturbing beam deflection system and method for high repetition rate temperature measurement of combustion flames
[AD-D012154] N86-24780
GAS TUNGSTEN ARC WELDING
Effect of forced convection heat transfer on weld pools
[AD-A163970] N86-24998
GAS TURBINE ENGINES
Altitude ignition/lean decel study
[AD-A163052] N86-24781
Life prediction and constitutive models for engine hot section anisotropic materials program
[NASA-CR-174952] N86-25003
GAS TURBINES
One-piece HPTR blade squealer tip
[AD-D012003] N86-24698
Dilution jet mixing program, phase 3
[NASA-CR-174884] N86-24938
GAS-GAS INTERACTIONS
Overlayer-induced enhanced oxidation of GaAs surfaces
[AD-A163450] N86-25270
GAS-SOLID INTERACTIONS
High temperature gas energy transfer
[AD-A163020] N86-25229
GAS-SOLID INTERFACES
Effect of forced convection heat transfer on weld pools
[AD-A163970] N86-24998
GASES
High resolution coherent anti-Stokes Raman spectroscopy of deuterium gas
[AD-A163946] N86-24779
GATES (CIRCUITS)
Study and analysis of AlGaAs/GaA modulation doped field-effect transistors incorporating p-type Schottky gate barriers
[AD-A164103] N86-24922
A gated microchannel plate image intensifier packaged in a reflex camera back
[AD-A163015] N86-24970
GEARS
Testing of YUH-61A helicopter transmission in NASA Lewis 2240-kW (3000-hp facility
[NASA-TP-2538] N86-24992
GEOCHEMISTRY
A strategy for adoption of accelerator mass spectrometry by the Earth sciences
[TI85-901777] N86-25031
GEODESY
Geopotential research mission science, engineering and program summary
[NASA-TM-86240] N86-25030
GEODYNAMICS
Geopotential research mission science, engineering and program summary
[NASA-TM-86240] N86-25030
GEOGRAPHIC INFORMATION SYSTEMS
Application of hierarchical data structures to geographical information systems
[AD-A163674] N86-25293
GEOIDS
Dynamically supported geoid highs over hotspots: Observation and theory
[NASA-CR-176766] N86-25089
GEOLOGICAL SURVEYS
Chemical, petrographic and K-Ar age data to accompany reconnaissance geologic strip map from Kingman to South of Bill Williams Mountain, Arizona
[DE85-014242] N86-25035
Water resources data for Georgia, water year 1984
[PB86-127016] N86-25038
GEOMAGNETISM
Technical evaluation report on the ElectromagneticWave Propagation Panel Symposium on Propagation Effects on Military Systems in the High Latitude Region
[AGARD-AR-218] N86-24903
Geopotential research mission science, engineering and program summary
[NASA-TM-86240] N86-25030
GEOMETRY
Airborne bistatic radar limitations and sample calculations
[AD-A163941] N86-24892
A theory for classified quantities
[INPE-3788-PRE/863] N86-25178
GEOPHYSICS
A strategy for adoption of accelerator mass spectrometry by the Earth sciences
[TI85-901777] N86-25031
GEOPOTENTIAL RESEARCH MISSION
Geopotential research mission science, engineering and program summary
[NASA-TM-86240] N86-25030
GEORGIA
Water resources data for Georgia, water year 1984
[PB86-127016] N86-25038
GEOSTROPHIC WIND
Near-inertial wave propagation in geostrophic shear N86-25108
GEOSYNCHRONOUS ORBITS
Impact of the 1985 Space World Administrative Radio Conference on frequency/orbit planning and use
[NASA-TM-87285] N86-24881
GERMANIUM COMPOUNDS
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163537] N86-25272
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163559] N86-25273
GERMANIUM DIODES
Gamma-ray background induced in a double Ge(Li) spectrometer at balloon altitudes in the hemisphere
[INPE-3797-PRE/892] N86-25317
GIMBALS
Evaluation of a double Gimbal IPACS design
[NASA-CR-178040] N86-24745
Kalman filter design for the long range intercept function of the F-4E/G fire control system
[AD-A164205] N86-24926
Theoretical three-and four-axis gimbal robot wrists
[NASA-TP-2564] N86-25168
GLASS
Effects of seawater and deionized water at 0 to 80 deg C on the flexural properties of a glass/epoxy composite
[NASA-TM-86544] N86-24758
GLOBAL ATMOSPHERIC RESEARCH PROGRAM
A diagnostic analysis of the Pyrenees lee wave event of 21-23 March 1982 N86-25098
GLOBAL POSITIONING SYSTEM
Reliability of navigation service provided by the global positioning system
[AD-A163541] N86-24680
GLOVES
The effect of cold training and the wearing of gloves on manual performance in the cold: A comparison of pure ability and operational tasks
[AD-A163893] N86-25124
GLUTAMATES
Chemically induced damage to the hippocampal formation
[NDRE/PUBL-86/1002] N86-25112
Multidisciplinary studies on excitatory amino acids as transmitters in the brain
[AD-A164258] N86-25115

GOALS
Testimony of Fred R. Mynatt, Associate Director for Nuclear and Engineering Technologies, Oak Ridge National Laboratory, before the Subcommittee on Energy Research and Production of the Committee on Science and Technology, US House of Representatives
[DE86-002234] N86-25053
GOGGLES
Compendium of protective eyewear
[PB86-135779] N86-25126
GOODNESS OF FIT
Modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises tests for the Pareto distribution with unknown location and scale parameters
[AD-A163837] N86-25193
GOVERNMENT PROCUREMENT
Trends in industrial R and D activities in the United States, Europe and Japan, 1963-83
[PB86-141371] N86-25290
Cost estimating relationships for fixed wing aircraft: List price versus empty weight
[AD-A164196] N86-25300
GOVERNMENT/INDUSTRY RELATIONS
Trends in industrial R and D activities in the United States, Europe and Japan, 1963-83
[PB86-141371] N86-25290
GOVERNMENTS
Managing federal information resources: Report under the Paperwork Reduction Act of 1980
[PB86-247682] N86-25299
GRAIN SIZE
Advanced processing and properties of high performance alloys
[AD-A163469] N86-24820
GRANULAR MATERIALS
Damping properties os granule-based composite materials
[BLL-M-36692-(5828.4)] N86-24754
GRAPHITE
The determination of the natural frequencies and mode shapes for anisotropic laminated plates including the effects of shear deformation and rotatory inertia
[AD-A164040] N86-24763
GRAPHITE-EPOXY COMPOSITES
Quantitative non-destructive testing
[NASA-CR-176761] N86-25001
The buckling of composite cylindrical panels considering environmental effects
[AD-A163878] N86-25024
GRATINGS (SPECTRA)
Routing of high data rate signals using degenerate four wave mixing in BSO
[AD-A163746] N86-25240
GRAVIMETRY
Design of a digital controller for an ultragravimetric microbalance
[AD-A164014] N86-24971
GRAVITATION
Geopotential research mission science, engineering and program summary
[NASA-TM-86240] N86-25030
GRAVITATIONAL EFFECTS
Research and competition: Best partners
[NASA-TM-87313] N86-25321
GRAVITY WAVES
A morphological study of waves in the thermosphere using DE-2 observations
[NASA-CR-176775] N86-25070
GREENLAND
Physical oceanographic data marginal ice zone experiment R/V POLAR QUEEN, June-July 1984
[AD-A163591] N86-25101
GRINDING (COMMINUTION)
Particle size reduction of Si3N4 with Si3N4 milling hardware
[NASA-TM-86864-REV] N86-24839
GROUND EFFECT (AERODYNAMICS)
Aircraft Noise Prediction Program theoretical manual: Propeller aerodynamics and noise
[NASA-TM-83199] N86-25220
GROUND SUPPORT EQUIPMENT
Ground Software Maintenance Facility (GSMF) system manual
[NASA-CR-178804] N86-25143
GROUND TESTS
Use of state estimation to calculate angle-of-attack position error from flight test data
[AD-A163962] N86-24670
Ground vibration test of an F-16 airplane with modified decoupler pylons
[NASA-TM-87634] N86-24685
GROUND WIND
A one-level mesoscale model for diagnosing surface winds in mountainous and coastal regions N86-25097
GROUP DYNAMICS
Behavioral considerations for space station design
[AD-A163478] N86-25118
GROUP VELOCITY
Stress waves in transversely isotropic media: The homogeneous problem
[NASA-CR-3977] N86-25002
GROWTH
Controlling nonpoint pollution in Virginia's urbanizing areas: An institutional perspective
[AD-A163693] N86-25057
On the two-phase Stefan problem with interfacial energy and entropy
[AD-A163715] N86-25211
GUIDANCE (MOTION)
Configuration study of new low-loss MM (Millimeter) wave guiding structures
[AD-A163784] N86-24914
AGARD Bulletin: Meetings, publications, membership
[AGARD-BULL-86/1] N86-25285
GUIDE VANES
Flat plate and turbine vane cascade heat transfer investigation using a shock tube
[AD-A163992] N86-24947
GULF STREAM
Current variability near the southeast Newfoundland ridge
[AD-A163644] N86-25102
GUN PROPELLANTS
CARS (Coherent Anti-Stokes Raman Scattering) spectroscopy of the reaction zone of methane-nitrous oxide and RDX propellant flames
[AD-A163465] N86-24773
Radical fluorescence studies with liquid propellants
[AD-A163472] N86-24857
GUSTS
Loads and motions of an F-106B flying through thunderstorms
[NASA-TM-87671] N86-24672
GYROSCOPES
Gyro and accelerometer based navigation system for a mobile autonomous robot
[AD-A164036] N86-24682

H

HABITATS
Ducks Unlimited Joint Research Project
[NASA-TM-88755] N86-25032
HALL EFFECT
Properties of organic superconductors
[AD-A163573] N86-25274
HALOGEN COMPOUNDS
Radiation augmented propulsion feasibility
[AD-A163983] N86-24752
HALOGEN OCCULTATION EXPERIMENT
Halogen occultation experiment intergrated test plan
[NASA-TM-87709] N86-24744
HAMILTONIAN FUNCTIONS
Remarks on the existence and uniqueness of unbounded viscosity solutions of Hamilton-Jacobi equations
[AD-A163701] N86-25189
Quantum mechanical atomic energy operator
[AD-A163839] N86-25226
HAND (ANATOMY)
Theoretical three-and four-axis gimbal robot wrists
[NASA-TP-2564] N86-25168
HANDLING EQUIPMENT
Evaluation of Army engine oils in Hydraulic/Power transmission system components
[AD-A163527] N86-24847
HARMONIC EXCITATION
FORTRAN program for vibration and sound radiation of spherical shell
[AD-A163752] N86-25022
HAZARDS
Test results for the 2.5-kVA ground fault protector
[AD-A163501] N86-24912
Comprehensive integrated remote sensing for US Department of Energy applications
[DE86-002101] N86-25036
HEAO 3
Abundances of heavy cosmic rays at energies up to 1000 GeV/amu N86-25318
HEAT EXCHANGERS
Dual mode heat exchanger
[AD-D012156] N86-24944
Advanced on-site power plant development technology program
[NASA-CR-174709] N86-25040
HEAT FLUX
Experimental investigation of turbulent heat transfer in straight and curved rectangular ducts
[AD-A164142] N86-24950
HEAT MEASUREMENT
The science of and advanced technology for cost-effective manufacture of high precision engineering products. Volume 4. Thermal effects on the accuracy of numerically controlled machine tool
[AD-A163598] N86-24871
HEAT PIPES
Experimental assessment of advanced Stirling component concepts
[NASA-CR-174994] N86-25302
HEAT RESISTANT ALLOYS
Anisotropy of high temperature strength in precipitation-hardened nickel-base superalloy single crystals
[NASA-TM-88387] N86-24815
Thermal-mechanical fatigue behavior of nickel-base superalloys
[NASA-CR-175048] N86-24818
Advanced processing and properties of high performance alloys
[AD-A163469] N86-24820
Synthesis and properties of elevated temperature P/M aluminum alloys
[AD-A164158] N86-24827
Improved piston ring materials for 650 deg C service
[NASA-CR-175058] N86-24845
Life prediction and constitutive models for engine hot section anisotropic materials program
[NASA-CR-174952] N86-25003
Predicting the effects of overloads on sustained-load crack growth in a high-temperature superalloy
[AD-A164018] N86-25026
HEAT TRANSFER
Evaluation of capillary reinforced composites
[NASA-CR-175061] N86-24760
Heat transfer in compartment fires near regions of ceiling jet-wall impingement N86-24866
Unsteady heat transfer and direct comparison to steady-state measurements in a rotor-wake experiment
[NASA-TM-87220] N86-24934
Dual mode heat exchanger
[AD-D012156] N86-24944
Flat plate and turbine vane cascade heat transfer investigation using a shock tube
[AD-A163992] N86-24947
Experimental investigation of turbulent heat transfer in straight and curved rectangular ducts
[AD-A164142] N86-24950
Vapor phase heat transport systems
[DE86-004360] N86-24954
Effect of forced convection heat transfer on weld pools
[AD-A163970] N86-24998
HEAT TRANSFER COEFFICIENTS
Unsteady solution of the boundary layer equations with application to space shuttle tiles
[AD-A164105] N86-24727
HEAT TREATMENT
Effectiveness of laser treatment of materials by scanning beam
[BLL-M-36690-(5828.4)] N86-24793
The heat treatment of Ti-Al-V system alloy foil produced by vacuum precipitation
[BLLD-5828.4-M-36668] N86-24801
A method for fabricating magnetodielectric cores
[AD-A163457] N86-24911
Positron annihilation studies of very fine structured materials
[AD-A163822] N86-25225
HEAVY IONS
Proceedings of Topical Meeting on Particle Beam Fusion and its Related Problems, volume 1
[IPPJ-769-VOL-1] N86-25258
HEAVY NUCLEI
Abundances of heavy cosmic rays at energies up to 1000 GeV/amu N86-25318
HELICOPTER DESIGN
System life and reliability modeling for helicopter transmissions
[NASA-CR-3967] N86-24990
HELICOPTERS
Rotor performance characteristics from an aeroacoustic helicopter wind-tunnel test program
[NASA-TM-87661] N86-24665
Swashplate control system
[NASA-CASE-ARC-11633-1] N86-24700
Testing of YUH-61A helicopter transmission in NASA Lewis 2240-kW (3000-hp facility
[NASA-TP-2538] N86-24992
A review of the pilot backache problem in the CH113 Labrador helicopter
[AD-A164011] N86-25113
Helicopter rotor noise due to ingestion of atmospheric turbulence
[NASA-CR-3973] N86-25216

HELMHOLTZ VORTICITY EQUATION
POSSOL: Poisson equation solver
[DE86-002292] N86-25160
HEMATOLOGY
Review of modified hemoglobin solutions for use as temporary blood substitutes
[AD-A164210] N86-25114
HEMATOPOIETIC SYSTEM
Review of modified hemoglobin solutions for use as temporary blood substitutes
[AD-A164210] N86-25114
HEMODYNAMIC RESPONSES
Review of modified hemoglobin solutions for use as temporary blood substitutes
[AD-A164210] N86-25114
HETEROCYCLIC COMPOUNDS
Method for making heterocyclic block copolymer
[AD-D011971] N86-24853
HETERODYNING
Beam-modulation methods in quantitative and flow visualization holographic interferometry
[NASA-TM-87306] N86-24958
Far infrared heterodyne detection with gallium doped germanium photoconductors
[AD-A163879] N86-25242
HETEROGENEITY
The design and implementation of a relational to network query translator for a distributed database management system
[AD-A164013] N86-25296
HF LASERS
Reverse-wave suppressor mirror effects on CW HF unstable ring laser performance
[AD-A163529] N86-24979
HIGH ALTITUDE
Electromagnetic pulse: The fifth factor in the impact of a nuclear explosion
[AD-A163695] N86-24885
HIGH ENERGY INTERACTIONS
Nuclear structure studies by the scattering of medium-energy electrons
[DE86-002265] N86-25234
Science policy study. Volume 7: International cooperation in science
[GPO-52-263] N86-25301
HIGH FREQUENCIES
Space station 20-kHz power management and distribution system
[NASA-TM-87314] N86-24747
Technical evaluation report on the ElectromagneticWave Propagation Panel Symposium on Propagation Effects on Military Systems in the High Latitude Region
[AGARD-AR-218] N86-24903
Modification of the ionospheric electron velocity distribution function due to resonant absorption of HF waves
[AD-A163025] N86-25073
HIGH PASS FILTERS
Computer model of a passive synthetic aperture imaging system
[AD-A164144] N86-25158
HIGH POLYMERS
Synthesis of alkyl and aryl phosphazene high polymers
[AD-A163543] N86-24848
HIGH POWER LASERS
Laser interaction in long-scalelength plasmas
[AD-A163604] N86-25262
HIGH PRESSURE
One-piece HPTR blade squealer tip
[AD-D012003] N86-24698
HIGH RESOLUTION
A diagnostic analysis of the Pyrenees lee wave event of 21-23 March 1982 N86-25098
HIGH REYNOLDS NUMBER
Separated flows
[AD-A163551] N86-24939
HIGH SPEED
Arithmetic circuitry for high speed VLSI Winograd Fourier transform processor
[AD-A163943] N86-24917
Control circuitry for high speed VLSI (Very Large Scale Integration) winograd fourier transform processors
[AD-A164043] N86-24921
Image segmentation using the military specification 1750A
[AD-A164180] N86-25138
HIGH SPEED CAMERAS
Hall station and camera system operation and maintenance manual
[NASA-CR-178836] N86-24966
HIGH SPEED PHOTOGRAPHY
Optical studies of electrical discharge-liquid propellant interactions
[AD-A164156] N86-24784
ACTA Armamentarii (selected articles)
[AD-A163713] N86-24861
HIGH STRENGTH STEELS
Relying on progress of technology, to develop our alloy steel
[AD-A163690] N86-24825
HIGH TEMPERATURE
Altitude ignition/lean decel study
[AD-A163052] N86-24781
Competing unimolecular reactions of flame radicals. Part 1: Isomerization and dissociation of the methoxy radical
[AD-A164154] N86-24783
Influence of parameters of microstructure on process of hot deformation of two-phase steel
[BLL-M-36626-(5828.4)] N86-24805
Application of an atmospheric pressure sampling mass spectrometer to chlorination reactions
[NASA-TM-87270] N86-24813
Anisotropy of high temperature strength in precipitation-hardened nickel-base superalloy single crystals
[NASA-TM-88387] N86-24815
Tailoring multiphase ceramics
[AD-A164010] N86-24855
Flat plate and turbine vane cascade heat transfer investigation using a shock tube
[AD-A163992] N86-24947
Effects of state recovery on creep buckling under variable loading
[NASA-CR-175094] N86-25310
HIGH TEMPERATURE GASES
Feasibility study and verified design concept for new improved hot gas facility
[NASA-CR-178828] N86-24719
Convective heating of energetic materials
[AD-A163919] N86-24778
Hot gas corrosion of silicon based ceramics
[AD-A163810] N86-24850
High temperature gas energy transfer
[AD-A163020] N86-25229
HILBERT SPACE
Numerical approximation for the infinite-dimensional discrete-time optimal linear-quadratic regulator problem
[NASA-CR-178081] N86-25176
HIPPOCAMPUS
Chemically induced damage to the hippocampal formation
[NDRE/PUBL-86/1002] N86-25112
HISTOCHEMICAL ANALYSIS
Chemically induced damage to the hippocampal formation
[NDRE/PUBL-86/1002] N86-25112
HISTORIES
Overview of space technology
[AD-A163887] N86-24715
The long-range shelling of Paris and physical chemistry problems of extremely long-range firing
[NASA-TM-86416] N86-24868
HMX
CARS (Coherent Anti-Stokes Raman Scattering) spectroscopy of the reaction zone of methane-nitrous oxide and RDX propellant flames
[AD-A163465] N86-24773
Convective heating of energetic materials
[AD-A163919] N86-24778
HOLOGRAPHIC INTERFEROMETRY
Compacting kinetics of metal powders during pressing
[BLLD-5828.4-M-36666] N86-24800
Beam-modulation methods in quantitative and flow visualization holographic interferometry
[NASA-TM-87306] N86-24958
HOLOGRAPHY
Non-destructive laser holographic testing of solid propellant for unbonding defects
[AD-A163694] N86-24860
Holographic investigation of solid propellant combustion in a three-dimensional motor
[AD-A164217] N86-24864
Beam-modulation methods in quantitative and flow visualization holographic interferometry
[NASA-TM-87306] N86-24958
Routing of high data rate signals using degenerate four wave mixing in BSO
[AD-A163746] N86-25240
Parallel image transmission through a single optical fiber
[AD-A163809] N86-25241
HOOKS
Properties of 14Kh17N2 steel in corrosive environment
[BLL-M-36691-(5828.4)] N86-24794
HOT PRESSING
Advanced processing and properties of high performance alloys
[AD-A163469] N86-24820
HOT SURFACES
High temperature gas energy transfer
[AD-A163020] N86-25229
HOT-FILM ANEMOMETERS
An experimental investigation on location of boundary layer transition on the NACA 0012 using surface hot film gages
[NASA-TM-88285] N86-24936
HOT-WIRE ANEMOMETERS
A schlieren and hot-wire investigation of karman vortex streets
[AD-A164101] N86-24949
HUBBLE SPACE TELESCOPE
The design, fabrication and delivery of a manipulator foot restraint mockup for space telescope development testing
[NASA-CR-178837] N86-25121
HUMAN BEHAVIOR
Education and computers: An AI (Artificial Intelligence) perspective
[AD-A163618] N86-25170
HUMAN BEINGS
Evaluating compliance with FCC (Federal Communications Commission) specified guidelines for human exposure to radiofrequency radiation
[PB86-127081] N86-25117
Behavioral considerations for space station design
[AD-A163478] N86-25118
Man-machine systems of the 1990 decade: Cognitive factors and human interface issues
[AD-A163865] N86-25123
HUMAN FACTORS ENGINEERING
Spacecraft architecture
[NASA-TM-77908] N86-24736
Physical, anthropometrical, and body composition characteristics of workers at Kennedy Space Center
[NASA-TM-83102] N86-25122
HUMAN PERFORMANCE
Behavioral considerations for space station design
[AD-A163478] N86-25118
The effect of cold training and the wearing of gloves on manual performance in the cold: A comparison of pure ability and operational tasks
[AD-A163893] N86-25124
HUMIDITY
Environmental tests of metallization systems for terrestrial photovoltaic cells
[JPL-PUBL-85-86] N86-25045
HURRICANES
Geophysical Fluid Dynamics Laboratory activities FY 1985, plans FY 1986
[PB86-113545] N86-25095
HYDRATION
Catalysis of hydrolysis reactions by platinum and nickel phosphine complexes
[AD-A163666] N86-24775
HYDRAULIC EQUIPMENT
Fireproof hydraulic brake system
[AD-A163542] N86-24688
Evaluation of Army engine oils in Hydraulic/Power transmission system components
[AD-A163527] N86-24847
HYDRAULIC FLUIDS
Fireproof hydraulic brake system
[AD-A163542] N86-24688
Evaluation of Army engine oils in Hydraulic/Power transmission system components
[AD-A163527] N86-24847
HYDRAULIC JETS
Water jet/spray measurement analysis
[NASA-CR-178802] N86-24930
HYDRIDES
A characterization of the chemical vapor deposition of gallium arsenide and indium phosphide in the hydride and chloride systems
[AD-A164259] N86-25279
HYDROCARBON FUELS
Mechanisms of combustion of hydrocarbon/alcohol fuel blends
[AD-A163737] N86-24776
HYDROCARBONS
Degree to which natural gas is dissociated during thermal oxidation pyrolysis
[BLL-M-36630-(5828.4)] N86-24804
Method for making heterocyclic block copolymer
[AD-D011971] N86-24853
Fungi and hydrocarbons in the marine environment
[PB86-109964] N86-25066
HYDROGEN
Radical fluorescence studies with liquid propellants
[AD-A163472] N86-24857
Development of 3 and 5 kW fuel cell power plants
[AD-A163603] N86-25047

HYDROGEN PEROXIDE
A volumetric method for titrimetric analysis of hydrogen peroxide
[AD-A163582] N86-24774
HYDROGRAPHY
A compilation of moored current meter and wind recorder data. Volume 38. Long-term upper ocean study (LOTUS) (Moorings 787, 788, 789, 790, 792), April 1983 - May 1984
[AD-A163897] N86-25103
HYDROLOGY
Water resources data for Georgia, water year 1984
[PB86-127016] N86-25038
National Weather Service (NWS) Southern Region QPF (Quantitative Precipitation Forecasting) Workshop
[PB85-199164] N86-25094
HYDROLYSIS
Catalysis of hydrolysis reactions by platinum and nickel phosphine complexes
[AD-A163666] N86-24775
HYDROMETEOROLOGY
Mariners Weather Log, volume 29, number 4, fall 1985
[PB86-142072] N86-25088
HYDROPHONES
A transducer for bottom-scattering measurements
[AD-A163987] N86-25222
HYDROSTATIC PRESSURE
Manufacture of ceramic sinters
[NASA-TM-86398] N86-24842
HYDROXYL RADICALS
Radical fluorescence studies with liquid propellants
[AD-A163472] N86-24857
HYPEROXIA
Review of modified hemoglobin solutions for use as temporary blood substitutes
[AD-A164210] N86-25114
HYPERSONIC AIRCRAFT
Selections from Flug Revue und Flugwelt International. A. On the border of Time-hypersonic flight. B. NASA programs pave the way for the hypersonic aircraft. C. Shuttle flight 61-B; construction in space. D. Faster than a bullet; hypersonic military aircraft
[NASA-TM-88418] N86-24652
HYPERSONIC BOUNDARY LAYER
Adaptive-grid optimization for minimizing steady-state, truncation error
[AD-A164038] N86-24948
HYPERSONIC FLIGHT
Selections from Flug Revue und Flugwelt International. A. On the border of Time-hypersonic flight. B. NASA programs pave the way for the hypersonic aircraft. C. Shuttle flight 61-B; construction in space. D. Faster than a bullet; hypersonic military aircraft
[NASA-TM-88418] N86-24652
HYPERSONICS
Adaptive-grid optimization for minimizing steady-state, truncation error
[AD-A164038] N86-24948
HYPERVELOCITY PROJECTILES
Laser-photodetector timing station instruction and maintenance manual
[NASA-CR-178835] N86-24720
HYSTERESIS
Nonlinear earthquake analysis of concrete building structures
[AD-A163517] N86-25021

I

ICE ENVIRONMENTS
Climate sensitivity of a numerical model of ice-sheet dynamics and thermodynamics
[PB86-119617] N86-25096
ICE FORMATION
In-flight measurements of wing ice shapes and wing section drag increases caused by natural icing conditions
[NASA-TM-87301] N86-24667
Ice detector
[NASA-CASE-LAR-13403-1] N86-24673
Evaluation of capillary reinforced composites
[NASA-CR-175061] N86-24760
An assessment of data quality and quantity from airborne cloud physics projects from 1974 through 1984
[DOT/FAA/CT-85/37] N86-25079
ICE NUCLEI
In-flight measurements of wing ice shapes and wing section drag increases caused by natural icing conditions
[NASA-TM-87301] N86-24667
IGNITION
Convective heating of energetic materials
[AD-A163919] N86-24778
Optical studies of electrical discharge-liquid propellant interactions
[AD-A164156] N86-24784
Radical fluorescence studies with liquid propellants
[AD-A163472] N86-24857
A dimensional analysis approach for characterizing pryotechnic mixture systems
[AD-A163018] N86-24863
IGNITION LIMITS
Altitude ignition/lean decel study
[AD-A163052] N86-24781
IMAGE INTENSIFIERS
Shuttering efficiencies of nanosecond-gated photoemissive shutter tubes
[DE85-015728] N86-25248
IMAGE PROCESSING
Orientation of circular connectors using vision processing
[AD-D012153] N86-24918
Image segmentation using the military specification 1750A
[AD-A164180] N86-25138
Computer model of a passive synthetic aperture imaging system
[AD-A164144] N86-25158
IMAGES
Content-Addressable Memory manager: Design and evaluation
[AD-A164037] N86-25133
Parallel image transmission through a single optical fiber
[AD-A163809] N86-25241
IMAGING RADAR
Pseudo-color display of laser radar imagery
[AD-A164213] N86-25246
IMAGING TECHNIQUES
Electromagnetic scattering from a slotted TM cylindrical conductor by the pseudo-image method
[AD-A163782] N86-24887
Hall station and camera system operation and maintenance manual
[NASA-CR-178836] N86-24966
A robot vision system
[AD-A164202] N86-24999
Image segmentation using the military specification 1750A
[AD-A164180] N86-25138
Computer model of a passive synthetic aperture imaging system
[AD-A164144] N86-25158
Continuous representations of digital images
[AD-A164189] N86-25245
IMPACT
Detection and location of ballistic damage in composite materials using acoustic emission methods
[AD-A164183] N86-24766
IMPACT STRENGTH
Properties of 14Kh17N2 steel in corrosive environment
[BLL-M-36691-(5828.4)] N86-24794
IMPLOSIONS
Vorticity production in delayed asymmetric cylindrical implosions
[DE86-004369] N86-24953
IMPURITIES
Impurity diffusion in NiO grain boundaries
[AERE-R-11763] N86-25280
IN-FLIGHT MONITORING
Real-time flight test PCM data acquisition monitor
[AD-A164035] N86-24897
Absolute bounds on set intersection and union sizes from distribution information
[AD-A164025] N86-25199
INCOHERENT SCATTERING
Jamming effects on digital communication receivers (timing errors and frequency errors)
[AD-A164199] N86-24900
INCOMPRESSIBILITY
Unsteady solution of the boundary layer equations with application to space shuttle tiles
[AD-A164105] N86-24727
Stationary motions and incompressible limit for compressible viscous fluids
[AD-A163600] N86-24941
Question of application of method of finite elements to problems of deformation of incompressible media
[BLLD-5828.4-M-36665] N86-25012
INCOMPRESSIBLE FLOW
Adaptive-grid optimization for minimizing steady-state, truncation error
[AD-A164038] N86-24948
INCOMPRESSIBLE FLUIDS
Stationary motions and incompressible limit for compressible viscous fluids
[AD-A163600] N86-24941
INDEPENDENT VARIABLES
A comparison of estimation techniques for the three parameter Pareto distribution
[AD-A163631] N86-25192
Modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises tests for the Pareto distribution with unknown location and scale parameters
[AD-A163837] N86-25193
A comparison of estimation techniques for the two parameter Cauchy distribution
[AD-A163833] N86-25205
INDIUM PHOSPHIDES
A characterization of the chemical vapor deposition of gallium arsenide and indium phosphide in the hydride and chloride systems
[AD-A164259] N86-25279
INDUSTRIES
Relying on progress of technology, to develop our alloy steel
[AD-A163690] N86-24825
Trends in industrial R and D activities in the United States, Europe and Japan, 1963-83
[PB86-141371] N86-25290
INELASTIC COLLISIONS
A quantum mechanical investigation of vibrational energy transfer in O ((3)P) + H sub 2 O collisions
[AD-A164159] N86-25232
INERTIA
The determination of the natural frequencies and mode shapes for anisotropic laminated plates including the effects of shear deformation and rotatory inertia
[AD-A164040] N86-24763
INERTIAL CONFINEMENT FUSION
Proceedings of Topical Meeting on Particle Beam Fusion and its Related Problems, volume 1
[IPPJ-769-VOL-1] N86-25258
INFERENCE
Statistical inferences in cross-lagged panel studies
[AD-A163892] N86-25120
INFINITE SPAN WINGS
ALESEP. Part 2: A computer program for the analysis of leading edge separation bubbles on infinite swept wings
[NASA-CR-178015] N86-24664
INFLATABLE STRUCTURES
A review of the pilot backache problem in the CH113 Labrador helicopter
[AD-A164011] N86-25113
INFORMATION DISSEMINATION
Safety study. Airline passenger safety education: A review of methods used to present safety information
[PB85-917014] N86-24676
Technology for large space systems: A bibliography with indexes
[NASA-SP-7046(13)] N86-24713
Ducks Unlimited Joint Research Project
[NASA-TM-88755] N86-25032
Managing federal information resources: Report under the Paperwork Reduction Act of 1980
[PB86-247682] N86-25299
INFORMATION FLOW
Managing federal information resources: Report under the Paperwork Reduction Act of 1980
[PB86-247682] N86-25299
INFORMATION MANAGEMENT
Managing federal information resources: Report under the Paperwork Reduction Act of 1980
[PB86-247682] N86-25299
INFORMATION RETRIEVAL
Technology for large space systems: A bibliography with indexes
[NASA-SP-7046(13)] N86-24713
Chemical Thermodynamics in Steam Power Cycles Data Requirements
[PB86-130937] N86-24787
INFORMATION SYSTEMS
Managing federal information resources: Report under the Paperwork Reduction Act of 1980
[PB86-247682] N86-25299
INFRARED DETECTORS
Conceptual design study: Forest Fire Advanced System Technology (FFAST)
[JPL-PUBL-86-5] N86-25034
Far infrared heterodyne detection with gallium doped germanium photoconductors
[AD-A163879] N86-25242
INFRARED LASERS
Determination of initial chemical steps in the gas-phase decomposition of energetic molecules
[AD-A163751] N86-24777
Induced Resonance Electron Cyclotron (IREC) quasi-optical maser
[AD-A164167] N86-24986

INFRARED PHOTOGRAPHY
Aerial camera research: Accuracy comparison using the ZEISS RMK 15/23 and the JENA LMK aerial cameras [PB86-126836] N86-24973
INFRARED RADIATION
Quantitative non-destructive testing [NASA-CR-176761] N86-25001
Empirical and modeled synoptic cloud climatology of the Arctic Ocean [NASA-CR-176752] N86-25078
Infrared background and target measurement HC A05/MF A01 [AD-A163567] N86-25238
INFRARED TELESCOPES
Electromagnetic pulse: The fifth factor in the impact of a nuclear explosion [AD-A163695] N86-24885
Thermal performance evaluation of the infrared telescope dewar subsystem [NASA-TM-86543] N86-25305
INFRARED TRACKING
Characteristics of Bayesian multiple model adaptive estimation for tracking airborne targets [AD-A163830] N86-24890
INGOTS
Reasons for low plasticity of steel of Type 25-20 [BLL-36604-SER-M-5828.4] N86-24790
INHOMOGENEITY
Enthalpies of formation of liquid three-component iron-cerium-aluminium alloys [BLL-M-36623-(5828.4)] N86-25282
INJECTION MOLDING
Frameless transparencies for aircraft cockpit enclosures [AD-D012155] N86-24689
Manufacture of ceramic sinters [NASA-TM-88398] N86-24842
Binders for compacting nitride type ceramics [NASA-TM-88397] N86-24844
INJECTORS
Altitude ignition/lean decel study [AD-A163052] N86-24781
INLET FLOW
A numerical analysis applied to high angle of attack three-dimensional inlets [NASA-TM-87298] N86-24658
Statistical prediction of dynamic distortion of inlet flow using minimum dynamic measurement. An application to the Melick statistical method and inlet flow dynamic distortion prediction without RMS measurements [NASA-CR-176764] N86-24933
Review and evaluation of recent developments in melic inlet dynamic flow distortion prediction and computer program documentation and user's manual estimating maximum instantaneous inlet flow distortion from steady-state total pressure measurements with full, limited, or no dynamic data [NASA-CR-176765] N86-24955
INPUT/OUTPUT ROUTINES
Distributed FIFO allocation of identical resources using small shared space [AD-A163988] N86-24716
Arithmetic circuitry for high speed VLSI Winograd Fourier transform processor [AD-A163943] N86-24917
Ground Software Maintenance Facility (GSMF) user's manual. Appendices NASA-CR-178806 NAS 1.26:178806 Rept-41849-G159-026-App HC A05/MF A01 [NASA-CR-178806] N86-25144
INSTALLING
Centerville Beach. Project completion report [AD-A163461] N86-25056
INSTRUMENT ERRORS
Gamma-ray background induced in a double Ge(Li) spectrometer at balloon altitudes in the hemisphere [INPE-3797-PRE/892] N86-25317
INSTRUMENT FLIGHT RULES
Aircraft accident/incident summary reports: Denver, Colorado, August 19, 1983; Blountville, Tennessee, July 16, 1983; Tucson, Arizona, February 6, 1983, Cockeysville, Maryland, April 26, 1984; Akron, Ohio, September 30, 1984; Seattle, Washington, October 18, 1984; Miami, Florida, November 11, 1983 [PB85-910409] N86-24675
INTAKE SYSTEMS
Evaluation of capillary reinforced composites [NASA-CR-175061] N86-24760
INTEGRAL EQUATIONS
An improved closure of the Born-Green-Yvon equation for the electric double layer [AD-A163452] N86-24772
Joint services electronics program [AD-A164151] N86-24924
INTEGRATED CIRCUITS
Algorithm definition for the VLSI design implementation of the electromagnetic radiation integral [AD-A163825] N86-24888
Analysis of optically controlled microwave/millimeter wave device structures [NASA-TM-87246] N86-24907
Research on devices for integrated millimeter wave systems [AD-A163903] N86-24916
Arithmetic circuitry for high speed VLSI Winograd Fourier transform processor [AD-A163943] N86-24917
A microcomputer-based menu-driven chip layout language [AD-A164109] N86-24923
Microenvironmental moisture research [AD-B157859] N86-25004
A single board multiprocessor for real-time contour surface display generation [AD-A163587] N86-25129
Architecture and numerical accuracy of high-speed DFT (Discrete Fourier Transform) processing systems [AD-A163963] N86-25132
A transducer for bottom-scattering measurements [AD-A163987] N86-25222
INTERACTIONAL AERODYNAMICS
ALESEP. Part 2: A computer program for the analysis of leading edge separation bubbles on infinite swept wings [NASA-CR-178015] N86-24664
INTERACTIVE CONTROL
Interactive communication channel [AD-D011968] N86-24893
Defense data Network/TOPS-20 tutorial: An interactive computer program [AD-A163675] N86-25294
INTERCEPTION
An analysis of the accessibility of Earth-approaching asteroids [AD-A163976] N86-25313
INTERCONTINENTAL BALLISTIC MISSILES
Stability of spinning ICBM (intercontinental ballistic missile) in first stage boost phase [AD-A164019] N86-24724
Estimation of ICBM (intercontinental ballistic missile) performance parameters [AD-A164021] N86-24725
INTERFACE STABILITY
The effect of energy dissipation due to friction at the joint of a simple beam structure [AD-A163975] N86-24739
Synthesis and properties of elevated temperature P/M aluminum alloys [AD-A164158] N86-24827
INTERFACES
An improved closure of the Born-Green-Yvon equation for the electric double layer [AD-A163452] N86-24772
Circuits and exchange parameters at the C2 interface in the case of sequential input-output of discrete information [AD-A163688] N86-24884
Real-time flight test PCM data acquisition monitor [AD-A164035] N86-24897
Design of a digital controller for an ultragravimetric microbalance [AD-A164014] N86-24971
Architecture and numerical accuracy of high-speed DFT (Discrete Fourier Transform) processing systems [AD-A163963] N86-25132
Development and implementation of the x.25 protocol for the universal network interface device (UNID) 2. Volume 2 [AD-A164042] N86-25134
Thin film technology of high-critical-temperature superconducting electronics [AD-A136053] N86-25278
INTERFACIAL ENERGY
The effect of energy dissipation due to friction at the joint of a simple beam structure [AD-A163975] N86-24739
Crack healing in polymers [AD-A164130] N86-24856
On the two-phase Stefan problem with interfacial energy and entropy [AD-A163715] N86-25211
INTERFACIAL TENSION
Lubricant foaming and aeration study, part 2 [AD-A163696] N86-24849
INTERIOR BALLISTICS
Measurement of interior ballistic performance using FM/FM radio telemetry techniques [AD-A164150] N86-24728
INTERMEDIATE FREQUENCIES
FORTRAN program for vibration and sound radiation of spherical shell [AD-A163752] N86-25022
INTERNAL COMPRESSION INLETS
Low-speed performance of an axisymmetric, mixed-compression, supersonic inlet with auxiliary inlets [NASA-TP-2557] N86-24694
INTERNAL ENERGY
Determination of initial chemical steps in the gas-phase decomposition of energetic molecules [AD-A163751] N86-24777
INTERNAL WAVES
Near-inertial wave propagation in geostrophic shear N86-25108
INTERNATIONAL COOPERATION
Proceedings of Conference on International Standards [PB86-130044] N86-24872
Science policy study. Volume 7: International cooperation in science [GPO-52-283] N86-25301
INTERNATIONAL SYSTEM OF UNITS
Journal of Research of the National Bureau of Standards, volume 90, number 4, July-August 1985 [PB86-137627] N86-24786
INTERPOLATION
Comparison of absorption and radiation boundary conditions using a time-domain three-dimensional finite difference electromagnetic computer code [AD-A163828] N86-25149
The Chinese Remainder Problem and polynomial interpolation [AD-A163626] N86-25186
Convergence of cubic spline interpolation with the Not-A-Knot condition [AD-A163705] N86-25190
INTERPROCESSOR COMMUNICATION
Analysis and design of a parameterized protocol converter [AD-A164171] N86-25137
INTERSTELLAR MATTER
Is G305.8-0.2 a young object? [INPE-3787-PRE/882] N86-25304
A polarimetric study of the insterstellar medium in Taurus dark clouds N86-25306
INTERVALS
Improved interval bounds for ranges of functions [AD-A163627] N86-25187
INVARIANCE
Quantum mechanical atomic energy operator [AD-A163839] N86-25226
INVENTIONS
Inductive energy for rapid strain guage attachment [NASA-CASE-LAR-13237-1] N86-24960
INVERSIONS
A new method for computing the generalized inverses of a matrix and its application to the Lyapunov matrix equation [AD-A163840] N86-25194
Remote measurement of the atmospheric isoplanatic angle and determination of refractive turbulence profiles by direct inversion of the scintillation amplitude covariance function with Tikhonov regularization [AD-A163629] N86-25239
INVERTERS
Advanced on-site power plant development technology program [NASA-CR-174709] N86-25040
INVESTIGATION
An experimental investigation of reducing advanced turboprop cabin noise by wing shielding [NASA-TM-87112] N86-25218
INVISCID FLOW
ALESEP. Part 2: A computer program for the analysis of leading edge separation bubbles on infinite swept wings [NASA-CR-178015] N86-24664
IODINE COMPOUNDS
Radiation augmented propulsion feasibility [AD-A163983] N86-24752
ION BEAMS
Dissociative electron attachment to rovibrationally excited molecules [AD-A163065] N86-25228
ION CURRENTS
Electron microscopy observation of electrotransport [AD-A164107] N86-25213
ION CYCLOTRON RADIATION
Advanced ICRF antenna design for R-TOKAMAK [IPPJ-759] N86-25249
Theoretical studies of magnetized plasma turbulence: Ion-cyclotron turbulence, and shear flow turbulence and its applications to tokamak edge phenomena N86-25265

ION EXCHANGING
Process for producing an electrode membrane unit for hydrogen/bromine cells
[NASA-TM-88396] N86-25041
A plasma wave instrument on the AMPTE/IRM (Active Magnetospheric Particle Tracing Explorers/Ion Release Module) spacecraft
[AD-A163048] N86-25074
ION IMPLANTATION
Investigation of paramagnetic response of metallic epoxies
[NASA-CR-176551] N86-24781
Microstructures of surface-melted alloys
[DE86-002916] N86-24819
ION MOTION
Quantum theory of ion motion and laser cooling in a radio frequency quadrupole trap
[AD-A163838] N86-25212
ION SOURCES
Volume produced H(-), D(-) ion source for proton accelerator and thermo-nuclear fusion research by sheet plasma (1)
[IPPJ-760] N86-25253
IONIZATION
Electromagnetic pulse: The fifth factor in the impact of a nuclear explosion
[AD-A163695] N86-24885
Studies on radiative collisional and ultraviolet lasers
[AD-A163901] N86-24982
IONIZATION CROSS SECTIONS
Dissociative electron attachment to rovibrationally excited molecules
[AD-A163065] N86-25228
IONIZATION POTENTIALS
Theoretical investigation of point defects of mercury cadmium telluride A01
[AD-A163735] N86-25277
IONIZING RADIATION
Process for crosslinking methylene-containing aromatic polymers with ionizing radiation
[NASA-CASE-LAR-13448-1] N86-24840
Method of making a resonator having a desired frequency from a quartz crystal resonator plate
[AD-D012157] N86-24919
IONOSPHERE
Omega long-term phase advances
[PB85-233211] N86-24902
Plasma observations in the auroral and polar cap region
[AD-A163654] N86-25071
Electron precipitation patterns in the vicinity of a VLF transmitter
[AD-A163716] N86-25072
IONOSPHERIC DISTURBANCES
Modification of the ionospheric electron velocity distribution function due to resonant absorption of HF waves
[AD-A163025] N86-25073
IONOSPHERIC HEATING
Technical evaluation report on the ElectromagneticWave Propagation Panel Symposium on Propagation Effects on Military Systems in the High Latitude Region
[AGARD-AR-218] N86-24903
Modification of the ionospheric electron velocity distribution function due to resonant absorption of HF waves
[AD-A163025] N86-25073
IONOSPHERIC PROPAGATION
Modification of the ionospheric electron velocity distribution function due to resonant absorption of HF waves
[AD-A163025] N86-25073
IONS
Kink stability of long ion layers
[IPPJ-756] N86-25250
IRON
Silicon distribution in synthetic cast iron
[BLL-M-36689-(5828.4)] N86-24792
IRON ALLOYS
Melting of solid solution during crystallization of alloy white cast iron
[BLL-M-36677-(5828.4)] N86-24796
Magnetic susceptibility of Fe-Cr-O alloys
[BLL-M-36643-(5828.4)] N86-24812
Positron annihilation studies of very fine structured materials
[AD-A163822] N86-25225
IRON COMPOUNDS
Abundances and energy spectra of high energy heavy cosmic-ray nuclei N86-25319
IRRADIATION
Non-linear optical techniques for visible and UV lasers and thin film deposition
[AD-A164168] N86-24828
Some advances in fracture studies under the Heavy-Section Steel Technology Program
[TI85-018096] N86-25029
Method of measuring field funneling and range straggling in semiconductor charge-collecting junctions
[NASA-CASE-NPO-16584-1-CU] N86-25269
Thermal desorption study of physical forces at the PTFE surface
[NASA-TM-87090] N86-25284
ISOMERIZATION
Competing unimolecular reactions of flame radicals. Part 1: Isomerization and dissociation of the methoxy radical
[AD-A164154] N86-24783
Vibrational energy transfer at a liquid gallium surface. Activation of unimolecular cyclobutene isomerization
[AD-A163023] N86-25230
ISOPARAMETRIC FINITE ELEMENTS
Burner liner thermal/structural load modeling: TRANCITS program user's manual
[NASA-CR-174891] N86-24931
ISOTHERMAL PROCESSES
Aerodynamic characteristics of gas cushion for cylinders
[BLL-M-36671-(5828.4)] N86-24656
Heat treatment of tool joints for drill pipes
[BLLD-5828.4-M-36669] N86-24802
ISOTHERMS
Unsteady solution of the boundary layer equations with application to space shuttle tiles
[AD-A164105] N86-24727
Adaptive-grid optimization for minimizing steady-state, truncation error
[AD-A164038] N86-24948
ISOTOPE SEPARATION
Electron microscopy observation of electrotransport
[AD-A164107] N86-25213
ISOTROPISM
On K-BKZ and other viscoelastic models as continuum generalization of the classical Spring-Dashpot models
[AD-A163703] N86-24943
ITERATION
A trust region algorithm for nonlinearly constrained optimization
[AD-A163986] N86-25154
IUE
International Ultraviolet Explorer Atlas of O-typespectra from 1200 to 1900 angstrom
[NASA-RP-1155] N86-25307

J

JAMMING
Jamming effects on digital communication receivers (timing errors and frequency errors)
[AD-A164199] N86-24900
JET AIRCRAFT
An LQG up-and away flight control design for the STOL F-15 aircraft
[AD-A164108] N86-24707
JET ENGINES
Evaluation of capillary reinforced composites
[NASA-CR-175061] N86-24760
Anisotropy of high temperature strength in precipitation-hardened nickel-base superalloy single crystals
[NASA-TM-88387] N86-24815
JET EXHAUST
Jet shielding of jet noise
[NASA-CR-3966] N86-25219
JET FLOW
Dilution jet mixing program, phase 3
[NASA-CR-174884] N86-24938
Jet shielding of jet noise
[NASA-CR-3966] N86-25219
JET IMPINGEMENT
Heat transfer in compartment fires near regions of ceiling jet-wall impingement N86-24866
JET MIXING FLOW
Structure and mixing in turbulent shear flows
[AD-A163584] N86-24940
JOINTS (JUNCTIONS)
The detumbling of an axially symmetric satellite with an orbital maneuvering vehicle by nonlinear feedback control
[AD-A163989] N86-24717
Crack healing in polymers
[AD-A164130] N86-24856
JOSEPHSON JUNCTIONS
Superconducting quantum devices, summary and conclusions
[DE86-001978] N86-25283
JOULE-THOMSON EFFECT
Electron microscopy observation of electrotransport
[AD-A164107] N86-25213
JUNCTION TRANSISTORS
Floating emitter solar cell junction transistor
[NASA-CASE-NPO-16467-1-CU] N86-24908

K

KALMAN FILTERS
Use of state estimation to calculate angle-of-attack position error from flight test data
[AD-A163962] N86-24670
An LQG up-and away flight control design for the STOL F-15 aircraft
[AD-A164108] N86-24707
LQG/LTR design of a robust flight controller for the STOL F-15
[AD-A164111] N86-24708
Characteristics of Bayesian multiple model adaptive estimation for tracking airborne targets
[AD-A163830] N86-24890
Kalman filter design for the long range intercept function of the F-4E/G fire control system
[AD-A164205] N86-24926
State estimation procedure based upon the duality concept
[INPE-3796-PRE/891] N86-25179
Preliminary kalman filter design to improve air combat maneuvering target estimation for the F-4E/G fire control system
[AD-A164034] N86-25200
Kalman filtering state noise adaptive estimation
[INPE-3790-PRE/885] N86-25202
KERNEL FUNCTIONS
Introduction to kernel density estimation
[AD-A163920] N86-25206
KINEMATICS
Structural design and kinematic configuration of two-armed robots
[NASA-TM-88419] N86-25000
Computerized upper-boundary-value solutions of problems in mechanical working of metals
[BLL-M-36627-(5828.4)] N86-25013
KINETICS
Determination of initial chemical steps in the gas-phase decomposition of energetic molecules
[AD-A163751] N86-24777
KNOWLEDGE
Knowledge-based transformational synthesis of efficient structures for concurrent computation
[AD-A164022] N86-25155

L

LAGRANGE MULTIPLIERS
A trust region algorithm for nonlinearly constrained optimization
[AD-A163986] N86-25154
The Chinese Remainder Problem and polynomial interpolation
[AD-A163626] N86-25186
LAGRANGE SIMILARITY HYPOTHESIS
A computational model for contact stress problems AD-A164190
[AD-A164190] N86-25027
LAMINAR BOUNDARY LAYER
A model for oxygen atom recombination on a silicon dioxide surface
[AD-A163990] N86-24782
Separated flows
[AD-A163551] N86-24939
LAMINAR FLOW
Natural laminar flow flight experiments on a swept wing business jet-boundary layer stability analyses
[NASA-CR-3975] N86-24659
Mechanisms of combustion of hydrocarbon/alcohol fuel blends
[AD-A163737] N86-24778
Effects of surface roughness on pressure distribution and boundary layer over compressor blades at high Reynolds number in a two-dimensional cascade
[AD-A163974] N86-24946
Numerical flow field calculations for a missile configuration at M = .6
[AD-A164155] N86-24951
Measurement of viscosity of gaseous mixtures at atmospheric pressure
[NASA-TP-2582] N86-24962
LAMINATES
The determination of the natural frequencies and mode shapes for anisotropic laminated plates including the effects of shear deformation and rotatory inertia
[AD-A164040] N86-24763
Three dimensional finite element analysis of failure in composite laminates N86-24768

Crack healing in polymers
[AD-A164130] N86-24856
The buckling of composite cylindrical panels considering environmental effects
[AD-A163878] N86-25024

LAND ICE
Climate sensitivity of a numerical model of ice-sheet dynamics and thermodynamics
[PB86-119617] N86-25096

LAND MANAGEMENT
Application of hierarchical data structures to geographical information systems
[AD-A163674] N86-25293

LAND USE
Comprehensive integrated remote sensing for US Department of Energy applications
[DE86-002101] N86-25036

LANDING AIDS
Computed centerline MLS (Microwave Landing System) approach demonstration at Washington National Airport
[AD-A163722] N86-24681

LANDING GEAR
Fireproof hydraulic brake system
[AD-A163542] N86-24688

LARGE SPACE STRUCTURES
Technology for large space systems: A bibliography with indexes
[NASA-SP-7046(13)] N86-24713
Generalized parity relations for large space structures with uncertain parameters
[NASA-CR-176762] N86-24730
Control of a large space structure using direct output feedback and modal suppression
[AD-A163980] N86-24738
Deployable geodesic truss structure A01
[NASA-CASE-LAR-13113-1] N86-24867
Satellite voice broadcast. Volume 1: Executive summary
[NASA-CR-175016] N86-24875
Satellite voice broadcast. Volume 2: System study
[NASA-CR-175017] N86-24876
Satellite voice broadcast system study, volume 2
[NASA-CR-174905] N86-24877
Measurement apparation and procedure for the determination of surface emissivities
[NASA-CASE-LAR-13455-1] N86-24880
Contributions to the understanding of large-scale coherent structures in developing free turbulent shear flows
[NASA-CR-176772] N86-24932
Mathematical correlation of modal parameter identification methods via system realization theory
[NASA-TM-87720] N86-25019

LASER ANEMOMETERS
Combined fringe and Fabry-Perot laser anemometer for three component velocity measurements in turbine stator cascade facility
[NASA-TM-87322] N86-24967

LASER APPLICATIONS
Laser-photodetector timing station instruction and maintenance manual
[NASA-CR-178835] N86-24720
Non-linear optical techniques for visible and UV lasers and thin film deposition
[AD-A164188] N86-24828
Experiments with digitally mastered LaserVision optical discs
[BBC-RD-1986/1] N86-24976
Microlens system formed on the end of a single mode fiber for laser applications N86-24988
Quantitative non-destructive testing
[NASA-CR-176761] N86-25001
Quantum theory of ion motion and laser cooling in a radio frequency quadrupole trap
[AD-A163838] N86-25212

LASER CAVITIES
Non-linear optical techniques for visible and UV lasers and thin film deposition
[AD-A164188] N86-24828
Optical feedback stabilization of laser diodes for passive resonance ring laser gyro applications
[AD-A163942] N86-24983

LASER DOPPLER VELOCIMETERS
Dual mode laser velocimeter
[NASA-CASE-ARC-11634-1] N86-24978

LASER GYROSCOPES
Optical feedback stabilization of laser diodes for passive resonance ring laser gyro applications
[AD-A163942] N86-24983

LASER HEATING
Effectiveness of laser treatment of materials by scanning beam
[BLL-M-36690-(5828.4)] N86-24793

LASER INDUCED FLUORESCENCE
Excitation anisotropy in laser-induced-fluorescence spectroscopy: Broad-line excitation case
[IPPJ-761] N86-25254

LASER OUTPUTS
High resolution coherent anti-Stokes Raman spectroscopy of deuterium gas
[AD-A163946] N86-24779
Effectiveness of laser treatment of materials by scanning beam
[BLL-M-36690-(5828.4)] N86-24793
Non-linear optical techniques for visible and UV lasers and thin film deposition
[AD-A164188] N86-24828
Holographic investigation of solid propellant combustion in a three-dimensional motor
[AD-A164217] N86-24864
Laser beam duct pressure controller system
[AD-D012017] N86-24984
Analysis of the gain-coupled distributed feedback laser as a source of short optical pulses N86-24987
Remote measurement of the atmospheric isoplanatic angle and determination of refractive turbulence profiles by direct inversion of the scintillation amplitude covariance function with Tikhonov regularization
[AD-A163629] N86-25239
Laser interaction in long-scalelength plasmas
[AD-A163604] N86-25262

LASER PLASMA INTERACTIONS
Chaos in laser-matter interactions N86-24989
Laser interaction in long-scalelength plasmas
[AD-A163604] N86-25262

LASER PLASMAS
Laser thermal propulsion
[AD-A164163] N86-24753
Laser interaction in long-scalelength plasmas
[AD-A163604] N86-25262

LASER PUMPING
Laser thermal propulsion
[AD-A164163] N86-24753

LASER RANGE FINDERS
Laser ranging and video display system
[NASA-CASE-MSC-20870-1] N86-24977

LASER SPECTROSCOPY
Investigation of breadboard temperature profiling system for SSME fuel preburner diagnostics
[NASA-CR-178799] N86-24957
Time and state resolved studies of molecular decomposition
[AD-A163881] N86-25227

LASERS
Non-destructive laser holographic testing of solid propellant for unbonding defects
[AD-A163694] N86-24860
Nonlinear analysis of efficiency enhancement in Ubitron/Free-Electron laser amplifiers
[AD-A163619] N86-24980
Introduction to free atoms and particles
[AD-A163586] N86-25224

LATERAL CONTROL
Swashplate control system
[NASA-CASE-ARC-11633-1] N86-24700

LAUNCH VEHICLES
Estimation of ICBM (intercontinental ballistic missile) performance parameters
[AD-A164021] N86-24725

LAUNCHING
Measurement of interior ballistic performance using FM/FM radio telemetry techniques
[AD-A164150] N86-24726

LAW (JURISPRUDENCE)
Controlling nonpoint pollution in Virginia's urbanizing areas: An institutional perspective
[AD-A163693] N86-25057

LEADERSHIP
Leadership on the flight deck: The influence of crew social relations and crew member experience on leadership style effectiveness in civil aviation flight crews
[CAR-8612] N86-25286

LEADING EDGE FLAPS
The behaviour and performance of leading edge vortex flaps
[CAR-8601] N86-24686
Experimental assessment of vortex retaining cavity flaps for maneuverability improvement on delta wing fighter aircraft
[AD-A164104] N86-24690

LEADING EDGES
ALESEP, Part 2: A computer program for the analysis of leading edge separation bubbles on infinite swept wings
[NASA-CR-178015] N86-24864
Investigation of rolling-up and interaction of leading-edge and trailing-edge vortex sheets on a slender delta wing
[AD-A163892] N86-24868
Experimental study of apex fences for lift enhancement on a highly swept delta wing configuration
[AD-A163877] N86-24705
Unsteady solution of the boundary layer equations with application to space shuttle tiles
[AD-A164105] N86-24727
Effects of surface roughness on pressure distribution and boundary layer over compressor blades at high Reynolds number in a two-dimensional cascade
[AD-A163974] N86-24946
Flat plate and turbine vane cascade heat transfer investigation using a shock tube
[AD-A163992] N86-24947

LEARNING
Multidisciplinary studies on excitatory amino acids as transmitters in the brain
[AD-A164258] N86-25115
Education and computers: An AI (Artificial Intelligence) perspective
[AD-A163618] N86-25170

LEARNING THEORY
Man-machine systems of the 1990 decade: Cognitive factors and human interface issues
[AD-A163865] N86-25123

LEAST SQUARES METHOD
Relative positioning of ocean bottom benchmarks AD-A164177 HC A05/MF A01
[AD-A164177] N86-24684
Characterization of the consistent weighted regression estimators
[AD-A163605] N86-25183

LEE WAVES
A diagnostic analysis of the Pyrenees lee wave event of 21-23 March 1982 N86-25098

LENSES
Laser thermal propulsion
[AD-A164163] N86-24753
A gated microchannel plate image intensifier packaged in a reflex camera back
[AD-A163015] N86-24970
Dual mode laser velocimeter
[NASA-CASE-ARC-11634-1] N86-24978
Microlens system formed on the end of a single mode fiber for laser applications N86-24988
Computer model of a passive synthetic aperture imaging system
[AD-A164144] N86-25158

LIAPUNOV FUNCTIONS
A new method for computing the generalized inverses of a matrix and its application to the Lyapunov matrix equation
[AD-A163840] N86-25194
On the two-phase Stefan problem with interfacial energy and entropy
[AD-A163715] N86-25211

LIBRARIES
Development of a run time math library for the 1750A airborne microcomputer
[AD-A163905] N86-25131

LIFE (DURABILITY)
NASA electrothermal auxiliary propulsion technology
[NASA-TM-87281] N86-24749
System life and reliability modeling for helicopter transmissions
[NASA-CR-3967] N86-24990
Long life nickel electrodes for a nickel-hydrogen cell: Cycle life tests
[NASA-CR-174815] N86-25046

LIFE CYCLE COSTS
Satellite voice broadcast. Volume 1: Executive summary
[NASA-CR-175016] N86-24875
Biomass economy
[AD-A163647] N86-25048

LIFE SCIENCES
USSR Space Life Sciences Digest, issue 5
[NASA-CR-3922(05)] N86-25109

LIFT AUGMENTATION
Experimental study of apex fences for lift enhancement on a highly swept delta wing configuration
[AD-A163877] N86-24705

LIFT DRAG RATIO
The behaviour and performance of leading edge vortex flaps
[CAR-8601] N86-24686
Experimental assessment of vortex retaining cavity flaps for maneuverability improvement on delta wing fighter aircraft
[AD-A164104] N86-24690
Experimental study of apex fences for lift enhancement on a highly swept delta wing configuration
[AD-A163877] N86-24705

LIGHT (VISIBLE RADIATION)
Detection and exploitation of vibration induced optical amplitude modulation
[AD-A164179] N86-25244

LIGHT AMPLIFIERS
Nonlinear analysis of efficiency enhancement in Ubitron/Free-Electron laser amplifiers
[AD-A163619] N86-24980
LIGHT CURVE
B and V photoelectric photometry and light curve solution of the interacting binary systems HI Puppis,BI Eridani and Sy Horologii N86-25314
LIGHT EMISSION
Laser thermal propulsion
[AD-A164163] N86-24753
LIGHT MODULATION
Detection and exploitation of vibration induced optical amplitude modulation
[AD-A164179] N86-25244
LIGHT SCATTERING
Interparticle interference during light scattering by submicroinhomogeneous glass
[NASA-TM-88407] N86-24843
LIGHT SOURCES
High efficiency pulse ultraviolet light source
[AD-D011965] N86-25243
LIGHT TRANSMISSION
Remote measurement of the atmospheric isoplanatic angle and determination of refractive turbulence profiles by direct inversion of the scintillation amplitude covariance function with Tikhonov regularization
[AD-A163629] N86-25239
LIGHTNING
Comparison of absorption and radiation boundary conditions using a time-domain three-dimensional finite difference electromagnetic computer code
[AD-A163828] N86-25149
LIKELIHOOD RATIO
The evaluation of the OSGLR algorithm for restructurable controls
[NASA-CR-178083] N86-24678
LINE OF SIGHT
Remote sensing of atmospheric winds by utilizing speckle-turbulence interaction and optical heterodyne detection
[AD-A164187] N86-25087
LINE SPECTRA
High resolution coherent anti-Stokes Raman spectroscopy of deuterium gas
[AD-A163946] N86-24779
Optical feedback stabilization of laser diodes for passive resonance ring laser gyro applications
[AD-A163942] N86-24983
Metallicity and the level of the ultraviolet rising branch in elliptical galaxies
[NASA-CR-176670] N86-25311
LINEAR ACCELERATORS
Proceedings of Topical Meeting on Particle Beam Fusion and its Related Problems, volume 1
[IPPJ-769-VOL-1] N86-25258
LINEAR CIRCUITS
Low pass filters with linear phase
[AD-A163984] N86-24920
LINEAR EQUATIONS
Combining and connecting linear, multi-input, multi-output subsystem models
[NASA-TM-85912] N86-25186
Solutions of nonlinear matrix equations
[AD-A163841] N86-25195
LINEAR POLARIZATION
Excitation anisotropy in laser-induced-fluorescence spectroscopy: Broad-line excitation case
[IPPJ-761] N86-25254
LINEAR SYSTEMS
Natural laminar flow flight experiments on a swept wing business jet-boundary layer stability analyses
[NASA-CR-3975] N86-24659
An LQG up-and away flight control design for the STOL F-15 aircraft
[AD-A164108] N86-24707
LQG/LTR design of a robust flight controller for the STOL F-15
[AD-A164111] N86-24708
Electron precipitation patterns in the vicinity of a VLF transmitter
[AD-A163716] N86-25072
Numerical approximation for the infinite-dimensional discrete-time optimal linear-quadratic regulator problem
[NASA-CR-178061] N86-25176
Application of hierarchical data structures to geographical information systems
[AD-A163674] N86-25293
LINEARITY
Shifting the closed-loop spectrum in the optimal linear quadratic regulator problem for hereditary systems
[NASA-CR-178082] N86-25167
Maximum likelihood recursion and stochastic approximation in sequential designs
[AD-A163628] N86-25188
LIQUID ALLOYS
Enthalpies of mixing of alkaline-earth metals with iron and nickel
[BLLD-5828.4-M-36625] N86-24806
Enthalpies of formation of liquid three-component iron-cerium-aluminium alloys
[BLL-M-36623-(5828.4)] N86-25282
LIQUID COOLING
Dual mode heat exchanger
[AD-D012156] N86-24944
LIQUID FLOW
Studies of vertical annular gas-liquid flows N86-24956
LIQUID FUELS
Space platform expendables resupply concept definition study
[NASA-CR-178619] N86-24732
Radical fluorescence studies with liquid propellants
[AD-A163472] N86-24857
LIQUID HELIUM
Thermal performance evaluation of the infrared telescope dewar subsystem
[NASA-TM-86543] N86-25305
LIQUID METALS
Vibrational energy transfer at a liquid gallium surface. Activation of unimolecular cyclobutene isomerization
[AD-A163023] N86-25230
LIQUID NITROGEN
Dynamic measurement of total temperature, pressure and velocity in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TP-2584] N86-24709
LIQUID SURFACES
Vibrational energy transfer at a liquid gallium surface. Activation of unimolecular cyclobutene isomerization
[AD-A163023] N86-25230
LIQUID-SOLID INTERFACES
Effect of forced convection heat transfer on weld pools
[AD-A163970] N86-24996
On the two-phase Stefan problem with interfacial energy and entropy
[AD-A163715] N86-25211
LIQUIDS
Mechanisms of combustion of hydrocarbon/alcohol fuel blends
[AD-A163737] N86-24776
Centerville Beach. Project completion report
[AD-A163461] N86-25056
LISTS
Cost estimating relationships for fixed wing aircraft: List price versus empty weight
[AD-A164196] N86-25300
LITHIUM
A plasma wave instrument on the AMPTE/IRM (Active Magnetospheric Particle Tracing Explorers/Ion Release Module) spacecraft
[AD-A163048] N86-25074
Dissociative electron attachment to rovibrationally excited molecules
[AD-A163065] N86-25228
LITHOSPHERE
Dynamically supported geoid highs over hotspots: Observation and theory
[NASA-CR-176766] N86-25069
LOAD TESTS
Analysis of the stress state in an Iosipescu shear test specimen
[NASA-CR-176745] N86-24755
LOADS (FORCES)
A research program in active control/aeroelasticity
[NASA-CR-176773] N86-24702
Simplified composite micromechanics for predicting microstresses
[NASA-TM-87295] N86-24759
Burner liner thermal/structural load modeling: TRANCITS program user's manual
[NASA-CR-174891] N86-24931
The buckling of composite cylindrical panels considering environmental effects
[AD-A163678] N86-25024
A review of the pilot backache problem in the CH113 Labrador helicopter
[AD-A164011] N86-25113
Effects of state recovery on creep buckling under variable loading
[NASA-CR-175094] N86-25310
LOGIC CIRCUITS
Control circuitry for high speed VLSI (Very Large Scale Integration) winograd fourier transform processors
[AD-A164043] N86-24921
Braille reading system
[NASA-CASE-LAR-13306-1] N86-25292
LOGISTICS
Fire resistant fuel program analysis and program management documentation
[AD-A163724] N86-24862
LONG TERM EFFECTS
Climate sensitivity of a numerical model of ice-sheet dynamics and thermodynamics
[PB86-119617] N86-25096
LONGERONS
Deployable geodesic truss structure A01
[NASA-CASE-LAR-13113-1] N86-24867
LONGITUDINAL CONTROL
Swashplate control system
[NASA-CASE-ARC-11633-1] N86-24700
LOOP ANTENNAS
Advanced ICRF antenna design for R-TOKAMAK
[IPPJ-759] N86-25249
LOOPS
LQG/LTR design of a robust flight controller for the STOL F-15
[AD-A164111] N86-24708
LORAN C
Test results for developing revised LORAN-C protection criteria AD-A164139 DOT-TSC-CG-85-4 DOT-CG-N-1-86 HC A04/MF A01
[AD-A164139] N86-24683
LOW ALTITUDE
Remote measurement of the atmospheric isoplanatic angle and determination of refractive turbulence profiles by direct inversion of the scintillation amplitude covariance function with Tikhonov regularization
[AD-A163629] N86-25239
LOW COST
Silicon production in a fluidized bed reactor
[JPL-PUBL-86-17] N86-25043
LOW FREQUENCIES
Particle simulation of low frequency fluctuations in a sheared magnetic field N86-25214
LOW PASS FILTERS
Low pass filters with linear phase
[AD-A163984] N86-24920
LOW PRESSURE
Two-dimensional confined jet thrust vector control with flow visualization and variable flow geometry
[AD-A164214] N86-24699
Competing unimolecular reactions of flame radicals. Part 1: Isomerization and dissociation of the methoxy radical
[AD-A164154] N86-24783
LOW SPEED
Low-speed performance of an axisymmetric, mixed-compression, supersonic inlet with auxiliary inlets
[NASA-TP-2557] N86-24694
LOW TEMPERATURE
The effect of cold training and the wearing of gloves on manual performance in the cold: A comparison of pure ability and operational tasks
[AD-A163893] N86-25124
LUBRICANTS
A preliminary study of ester oxidation on an aluminum surface using chemiluminescence
[NASA-TM-87242] N86-24835
Lubricant foaming and aeration study, part 2
[AD-A163696] N86-24849
Fire resistant fuel program analysis and program management documentation
[AD-A163724] N86-24862
LUBRICATING OILS
Evaluation of Army engine oils in Hydraulic/Power transmission system components
[AD-A163527] N86-24847

M

MACH NUMBER
Use of state estimation to calculate angle-of-attack position error from flight test data
[AD-A163962] N86-24870
An experimental study of clustered nozzles with variable shrouds
[AD-A163961] N86-24945
Flat plate and turbine vane cascade heat transfer investigation using a shock tube
[AD-A163992] N86-24947
Numerical flow field calculations for a missile configuration at M = .6
[AD-A164155] N86-24951
MACHINE TOOLS
The science of and advanced technology for cost-effective manufacture of high precision engineering products. Volume 4. Thermal effects on the accuracy of numerically controlled machine tool
[AD-A163598] N86-24871

MACHINING
The science of and advanced technology for cost-effective manufacture of high precision engineering products. Volume 4. Thermal effects on the accuracy of numerically controlled machine tool
[AD-A163598] N86-24871

MAGNETIC BEARINGS
The design and construction of a magnetic bearing
[AD-A163552] N86-24995

MAGNETIC FIELDS
Uniform transverse magnetic field inside a long cylinder
[AD-A163459] N86-25210
Particle simulation of low frequency fluctuations in a sheared magnetic field N86-25214

MAGNETIC FLUX
Electron precipitation patterns in the vicinity of a VLF transmitter
[AD-A163716] N86-25072
Particle simulation of low frequency fluctuations in a sheared magnetic field N86-25214

MAGNETIC PERMEABILITY
Magnetic susceptibility of Fe-Cr-O alloys
[BLL-M-36643-(5828.4)] N86-24812
Advanced artificial dielectric materials for millimeter wavelength applications. Part A
[AD-A164195] N86-24925

MAGNETIC PROPERTIES
Magnetic susceptibility of Fe-Cr-O alloys
[BLL-M-36643-(5828.4)] N86-24812

MAGNETIC PUMPING
Induced Resonance Electron Cyclotron (IREC) quasi-optical maser
[AD-A164167] N86-24986

MAGNETIC SIGNALS
Nonlinear analysis of efficiency enhancement in Ubitron/Free-Electron laser amplifiers
[AD-A163619] N86-24980

MAGNETIC TAPES
Abrasion and deformed layer formation of manganese-zinc ferrite in sliding contact with lapping tapes
[NASA-TM-87249] N86-24838
Braille reading system
[NASA-CASE-LAR-13306-1] N86-25292

MAGNETOHYDRODYNAMIC STABILITY
Lectures on topics in magnetic reconnection and transport in fusion devices
[IPPJ-762] N86-25255
The influence of a hot particle component on plasma stability
[IPPJ-755] N86-25256
Proceedings of Topical Meeting on Particle Beam Fusion and its Related Problems, volume 1
[IPPJ-769-VOL-1] N86-25258
Laser interaction in long-scalelength plasmas
[AD-A163604] N86-25262
Theoretical studies of magnetized plasma turbulence: Ion-cyclotron turbulence, and shear flow turbulence and its applications to tokamak edge phenomena N86-25265

MAGNETOHYDRODYNAMICS
NASA electrothermal auxiliary propulsion technology
[NASA-TM-87281] N86-24749
Measurement of density fluctuations on the JIPP T-II tokamak plasma by millimeter and sub-millimeter wave scattering
[IPPJ-766] N86-25261

MAGNETOMETERS
Set-up and demonstration of a Low Energy Electron Magnetometer (LEEM)
[NASA-CR-178091] N86-24963

MAGNETORESISTIVITY
Properties of organic superconductors
[AD-A163573] N86-25274

MAGNETOSPHERE
Electron precipitation patterns in the vicinity of a VLF transmitter
[AD-A163716] N86-25072
A plasma wave instrument on the AMPTE/IRM (Active Magnetospheric Particle Tracing Explorers/Ion Release Module) spacecraft
[AD-A163048] N86-25074

MAGNETRON SPUTTERING
Introduction to free atoms and particles
[AD-A163586] N86-25224

MAGNETS
Uniform transverse magnetic field inside a long cylinder
[AD-A163459] N86-25210
Positron annihilation studies of very fine structured materials
[AD-A163822] N86-25225

MAINTENANCE
Laser-photodetector timing station instruction and maintenance manual
[NASA-CR-178835] N86-24720
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 1. Sections 1 to 8
[AD-A163670] N86-24822
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 2: Appendices A3, A4, A6, A8
[AD-A163671] N86-24823
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 3: Appendix A7
[AD-A163672] N86-24824
Failure times in maintenance models
[AD-A163891] N86-25006

MALFUNCTIONS
An application of adaptive learning to malfunction recovery
[NASA-CR-166620] N86-25169

MAN MACHINE SYSTEMS
Man-machine systems of the 1990 decade: Cognitive factors and human interface issues
[AD-A163865] N86-25123

MANAGEMENT METHODS
Application of artificial intelligence to improve aircraft survivability
[AD-A164172] N86-24674
NASA's FIA (National Aeronautics and Space Administration's Financial Integrity Act) Program: NASA's progress in implementing Financial Integrity Act requirements
[PB86-135100] N86-25288
Evaluating R and D and new product development ventures: An overview of assessment methods $12.00/MF A01
[PB86-110806] N86-25289

MANEUVERABILITY
Experimental assessment of vortex retaining cavity flaps for maneuverability improvement on delta wing fighter aircraft
[AD-A164104] N86-24690

MANEUVERABLE SPACECRAFT
The detumbling of an axially symmetric satellite with an orbital maneuvering vehicle by nonlinear feedback control
[AD-A163989] N86-24717
A proposed design for an interim space rescue ferry vehicle
[AD-A164039] N86-24741

MANGANESE
Abrasion and deformed layer formation of manganese-zinc ferrite in sliding contact with lapping tapes
[NASA-TM-87249] N86-24838
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163537] N86-25272

MANIPULATORS
Structural design and kinematic configuration of two-armed robots
[NASA-TM-88419] N86-25000
Theoretical three-and four-axis gimbal robot wrists
[NASA-TP-2564] N86-25168
Real-time adaptive control of a robotic manipulator using three-dimensional stereoscopic vision feedback N86-25175

MANNED SPACE FLIGHT
Spacecraft architecture
[NASA-TM-77908] N86-24736

MANNED SPACECRAFT
Unsteady solution of the boundary layer equations with application to space shuttle tiles
[AD-A164105] N86-24727

MANUALS
The RAND-ABEL (Trademark) programming language: Reference manual
[AD-A163584] N86-25148

MANUFACTURING
Weather satellite costs have increased, problems have occurred in their manufacturing quality control
[PB86-131398] N86-24743

MANY BODY PROBLEM
Competing unimolecular reactions of flame radicals. Part 1: Isomerization and dissociation of the methoxy radical
[AD-A164154] N86-24783

MAPPING
Conceptual design study: Forest Fire Advanced System Technology (FFAST)
[JPL-PUBL-86-5] N86-25034
Surface construction from planar contours
[AD-A163610] N86-25184

MAPS
Monthly maps of sea level anomalies in the Pacific, 1975 1981. Report on the IGOSS (Integrated Global Ocean Services System) Sea Level Pilot Project
[AD-A163061] N86-25104
Application of hierarchical data structures to geographical information systems
[AD-A163674] N86-25293

MARAGING STEELS
Thermokinetic diagram of embrittlement of maraging steel 03N18K9M5T-VD
[BLLD-5828.4-M-36648] N86-24807

MARINE ENVIRONMENTS
Ducks Unlimited Joint Research Project
[NASA-TM-88755] N86-25032
Outer Continental Shelf Environment Assessment Program: Reports of principal investigators, volume 32
[PB86-134772] N86-25065
Fungi and hydrocarbons in the marine environment
[PB86-109964] N86-25066

MARINE METEOROLOGY
Mariners Weather Log, volume 29, number 4, fall 1985
[PB86-142072] N86-25088
A compilation of moored current meter and wind recorder data. Volume 38. Long-term upper ocean study (LOTUS) (Moorings 787, 788, 789, 790, 792), April 1983 - May 1984
[AD-A163897] N86-25103

MARINE TECHNOLOGY
Test results for the 2.5-kVA ground fault protector
[AD-A163501] N86-24912

MARKETING
Cost estimating relationships for fixed wing aircraft: List price versus empty weight
[AD-A164196] N86-25300

MARSHLANDS
The ecology of irregularly flooded salt marshes of the northeastern Gulf of Mexico: A community profile
[TI86-900237] N86-25068

MASKS
Compendium of protective eyewear
[PB86-135779] N86-25126

MASS DISTRIBUTION
Motion in the restricted problem of three bodies for small values of the mass parameter N86-25201

MASS SPECTROMETERS
A characterization of the chemical vapor deposition of gallium arsenide and indium phosphide in the hydride and chloride systems
[AD-A164259] N86-25279

MASS SPECTROSCOPY
Determination of initial chemical steps in the gas-phase decomposition of energetic molecules
[AD-A163751] N86-24777
A strategy for adoption of accelerator mass spectrometry by the Earth sciences
[TI85-901777] N86-25031
Schottky barrier surface science
[AD-A163574] N86-25275

MATCHED FILTERS
Parallel image transmission through a single optical fiber
[AD-A163809] N86-25241

MATHEMATICAL MODELS
The behaviour and performance of leading edge vortex flaps
[CAR-8601] N86-24666
A unique set of micromechanics equations for high temperature metal matrix composites
[NASA-TM-87154] N86-24757
Mathematical model of temperature conditions of cooling of metal during plastic deformation
[BLLD-5828.4-M-36663] N86-24798
Improved numerical implementation of the bounding surface plasticity model for cohesive soils
[AD-A163572] N86-24870
Dilution jet mixing program, phase 3
[NASA-CR-174884] N86-24938
Nonlinear analysis of efficiency enhancement in Ubitron/Free-Electron laser amplifiers
[AD-A163619] N86-24980
Dynamically supported geoid highs over hotspots: Observation and theory
[NASA-CR-176766] N86-25069
Climate sensitivity of a numerical model of ice-sheet dynamics and thermodynamics
[PB86-119617] N86-25096
A one-level mesoscale model for diagnosing surface winds in mountainous and coastal regions N86-25097
A trust region algorithm for nonlinearly constrained optimization
[AD-A163986] N86-25154

Higher order residual analysis for nonlinear time series with autoregressive correlation structures
[AD-A163611] N86-25185
Maximum likelihood recursion and stochastic approximation in sequential designs
[AD-A163628] N86-25188
Kalman filtering state noise adaptive estimation
[INPE-3790-PRE/885] N86-25202
Lectures on topics in magnetic reconnection and transport in fusion devices
[IPPJ-762] N86-25255
The influence of a hot particle component on plasma stability
[IPPJ-755] N86-25256
Graphical study of electromagnetic wave accessibility in tokamak plasmas near the electron-cyclotron frequency
[INPE-3810-PRE/896] N86-25257
Proceedings of Topical Meeting on Particle Beam Fusion and its Related Problems, volume 1
[IPPJ-769-VOL-1] N86-25258
A solidary wave of a relativistic magnetosonic wave propagating perpendicularly to a magnetic field
[IPPJ-767] N86-25260

MATHEMATICAL PROGRAMMING
Robust/resistant techniques of data analysis
[AD-A163972] N86-25153

MATRICES (CIRCUITS)
Unified matrices for electronic computers
[AD-A163689] N86-25130

MATRICES (MATHEMATICS)
Generalizing over conditions by combining the multitrait multimethod matrix and the representative design of experiments
[AD-A163685] N86-25119
Combining and connecting linear, multi-input, multi-output subsystem models
[NASA-TM-85912] N86-25166
Optimal quadratic asymptotic design approach and its applications
[NASA-TM-88389] N86-25177
A new method for computing the generalized inverses of a matrix and its application to the Lyapunov matrix equation
[AD-A163840] N86-25194
Solutions of nonlinear matrix equations
[AD-A163841] N86-25195

MAXIMUM LIKELIHOOD ESTIMATES
Robust estimation of the location parameter of life distributions
[AD-A163993] N86-25008
Maximum likelihood recursion and stochastic approximation in sequential designs
[AD-A163628] N86-25188
A comparison of estimation techniques for the two parameter Cauchy distribution
[AD-A163833] N86-25205

MAXWELL EQUATION
Thermal barrier potential of a tandem mirror
[IPPJ-768] N86-25259

MAYPOLE ANTENNAS
Technology for large space systems: A bibliography with indexes
[NASA-SP-7046(13)] N86-24713

MEASURING INSTRUMENTS
Ramp-integration technique for capacitance-type blade-tip clearance measurement
[NASA-TM-87241] N86-24964

MECHANICAL DEVICES
RADC (Rome Air Development Center) nonelectronic reliability notebook. Revision B
[AD-A163900] N86-25007
Dynamic and design sensitivity analysis of rigid and elastic mechanical systems with intermittent motion
[AD-A163982] N86-25025

MECHANICAL PROPERTIES
Behaviour of WB 35 pipe steel under dynamic loading in high-speed tensile tests
[BLL-RISLEY-TR-5279-(9091.9F)] N86-25011
Dynamic moire interferometry in mechanics research
[DE86-004128] N86-25028
Properties of organic superconductors
[AD-A163573] N86-25274

MELTING
Conductimetric determination of decomposition of silicate melts
[NASA-TM-88394] N86-24769

MELTING POINTS
Melting of solid solution during crystallization of alloy white cast iron
[BLL-M-36677-(5828.4)] N86-24796
Introduction to free atoms and particles
[AD-A163586] N86-25224

MEMBRANES
Process for producing an electrode membrane unit for hydrogen/bromine cells
[NASA-TM-88396] N86-25041
Multidisciplinary studies on excitatory amino acids as transmitters in the brain
[AD-A164258] N86-25115

MEMORY
Multidisciplinary studies on excitatory amino acids as transmitters in the brain
[AD-A164258] N86-25115
Man-machine systems of the 1990 decade: Cognitive factors and human interface issues
[AD-A163865] N86-25123
Content-Addressable Memory manager: Design and evaluation
[AD-A164037] N86-25133

MENTAL PERFORMANCE
Reasoning in real-time for the pilot associate: An examination of a model based approach to reasoning in real-time for artificial intelligence systems using a distributed architecture
[AD-A163947] N86-25171

MERCURY CADMIUM TELLURIDES
Theoretical investigation of point defects of mercury cadmium telluride A01
[AD-A163735] N86-25277

MERCURY COMPOUNDS
Laser probing and modification of MOCVD and VPE reactor kinetics
[AD-A163860] N86-24981
Theoretical investigation of point defects of mercury cadmium telluride A01
[AD-A163735] N86-25277

MESH
Convergence of cubic spline interpolation with the Not-A-Knot condition
[AD-A163705] N86-25190

MESOSCALE PHENOMENA
A one-level mesoscale model for diagnosing surface winds in mountainous and coastal regions N86-25097

METAL COATINGS
Low-solvent primer and finish coats for use on steel structures
[PB86-139326] N86-24834

METAL CUTTING
The science of and advanced technology for cost-effective manufacture of high precision engineering products. Volume 4. Thermal effects on the accuracy of numerically controlled machine tool
[AD-A163598] N86-24871

METAL MATRIX COMPOSITES
Thermoviscoplastic nonlinear constitutive relationships for structural analysis of high temperature metal matrix composites
[NASA-TM-87291] N86-24756
A unique set of micromechanics equations for high temperature metal matrix composites
[NASA-TM-87154] N86-24757
Damping characteristics of metal matrix composites
[AD-A163569] N86-24762

METAL OXIDE SEMICONDUCTORS
Technology for satellite power conversion
[NASA-CR-176777] N86-25042
Microprocessor controller with nonvolatile memory implementation
[AD-A164152] N86-25136

METAL OXIDES
Using REM oxides to modify steel
[BLL-M-36639-(5828.4)] N86-24791
Transverse microsections of thin oxide scales for AEM studies
[AERE-R-11266] N86-24833

METAL POWDER
Compacting kinetics of metal powders during pressing
[BLLD-5828.4-M-36666] N86-24800

METAL SURFACES
Method of making a resonator having a desired frequency from a quartz crystal resonator plate
[AD-D012157] N86-24919
Overlayer-induced enhanced oxidation of GaAs surfaces
[AD-A163450] N86-25270

METAL WORKING
Mathematical model of temperature conditions of cooling of metal during plastic deformation
[BLLD-5828.4-M-36663] N86-24798
Method of producing a three-dimensional coordinate grid
[BLLD-5828.4-M-36664] N86-24799
Orientation of circular connectors using vision processing
[AD-D012153] N86-24918
Computerized upper-boundary-value solutions of problems in mechanical working of metals
[BLL-M-36627-(5828.4)] N86-25013
Determination of main strength properties of 9KhF roll steel
[BLL-M-36651-(5828.4)] N86-25014

METALLICITY
Investigation of paramagnetic response of metallic epoxies
[NASA-CR-178551] N86-24761
Structural study of multilayered vanadium/nickel superlattices
[DE85-018396] N86-24831

METALLIZING
Environmental tests of metallization systems for terrestrial photovoltaic cells
[JPL-PUBL-85-86] N86-25045

METALS
Application of an atmospheric pressure sampling mass spectrometer to chlorination reactions
[NASA-TM-87270] N86-24813
Metal cluster topology. Part 3: Platinum carbonyl clusters
[AD-A164241] N86-24830
Outer Continental Shelf Environmental Assessment Program. Reports of principal investigators, volume 33
[PB86-134780] N86-25061

METASTABLE STATE
Synthesis and properties of elevated temperature P/M aluminum alloys
[AD-A164158] N86-24827

METEOROLOGICAL PARAMETERS
National Weather Service (NWS) Southern Region QPF (Quantitative Precipitation Forecasting) Workshop
[PB85-199164] N86-25094

METEOROLOGICAL SATELLITES
Weather satellite costs have increased, problems have occurred in their manufacturing quality control
[PB86-131398] N86-24743
Satellite cloud and precipitation analysis using a minicomputer
[AD-A163821] N86-25084

METEOROLOGICAL SERVICES
Los Angeles, California tornado of March 1, 1983
[PB86-141991] N86-25089

METHANE
Degree to which natural gas is dissociated during thermal oxidation pyrolysis
[BLL-M-36630-(5828.4)] N86-24804

METHYLENE
Process for crosslinking methylene-containing aromatic polymers with ionizing radiation
[NASA-CASE-LAR-13448-1] N86-24840

METRICATION
Journal of Research of the National Bureau of Standards, volume 90, number 4, July-August 1985
[PB86-137627] N86-24786

METROLOGY
Metrology for electromagnetic technology: A bibliography of NBS (National Bureau of Standards) publications
[PB86-130234] N86-24975

MICROBALANCES
Design of a digital controller for an ultragravimetric microbalance
[AD-A164014] N86-24971

MICROCHANNEL PLATES
The development and test of a pulse-counting imaging detector system for solar system studies at ultraviolet and visible wavelengths
[NASA-CR-176671] N86-24965
A gated microchannel plate image intensifier packaged in a reflex camera back
[AD-A163015] N86-24970

MICROCHANNELS
The development and test of a pulse-counting imaging detector system for solar system studies at ultraviolet and visible wavelengths
[NASA-CR-176671] N86-24965

MICROCOMPUTERS
Content-Addressable Memory manager: Design and evaluation
[AD-A164037] N86-25133
Introduction to the microcomputers for solving radar and electronic warfare problems
[AD-A164143] N86-25135
Computer assisted instruction for the C programming language on the Zenith Z-100 microcomputer system AFIT/GCS/MA/85D-2 HC A11/MF A01
[AD-A163842] N86-25150
Development of a computer aided design package for control system design and analysis for a personal computer (ICECAP-PC), volume 1
[AD-A163940] N86-25152
Benchmark analysis of database architectures: A case study
[PB86-126687] N86-25162

Design and implementation of a centralized data directory for a distributed database management system
[AD-A163843] N86-25295
An analysis of the accessibility of Earth-approaching asteroids
[AD-A163976] N86-25313
MICROCRACKS
Cracking resistance in a 4.5-inch (114-mm) plate of 7075-T7351 aluminum alloy
[AD-A164229] N86-24829
MICROFIBERS
Simplified composite micromechanics for predicting microstresses
[NASA-TM-87295] N86-24759
Microlens system formed on the end of a single mode fiber for laser applications N86-24988
MICROMECHANICS
A unique set of micromechanics equations for high temperature metal matrix composites
[NASA-TM-87154] N86-24757
Simplified composite micromechanics for predicting microstresses
[NASA-TM-87295] N86-24759
MICROMINIATURIZATION
Electron microscopy observation of electrotransport
[AD-A164107] N86-25213
MICROPARTICLES
A comprehensive model of the photophoretic force on a spherical microparticle
[AD-A163022] N86-24894
MICROPHONES
Reciprocity calibration in a plane wave resonator
[AD-A164149] N86-24972
MICROPROCESSORS
Real-time flight test PCM data acquisition monitor
[AD-A164035] N86-24897
Microprocessor controller with nonvolatile memory implementation
[AD-A164152] N86-25136
Image segmentation using the military specification 1750A
[AD-A164180] N86-25138
Absolute bounds on set intersection and union sizes from distribution information
[AD-A164025] N86-25199
MICROSTRUCTURE
Thermoviscoplastic nonlinear constitutive relationships for structural analysis of high temperature metal matrix composites
[NASA-TM-87291] N86-24756
A mixture model for unidirectionally fiber-reinforced composites
[AD-A164136] N86-24764
Using REM oxides to modify steel
[BLL-M-36639-(5828.4)] N86-24791
Melting of solid solution during crystallization of alloy white cast iron
[BLL-M-36677-(5828.4)] N86-24796
The heat treatment of Ti-Al-V system alloy foil produced by vacuum precipitation
[BLLD-5828.4-M-36668] N86-24801
Influence of parameters of microstructure on process of hot deformation of two-phase steel
[BLL-M-36626-(5828.4)] N86-24805
Microstructures of surface-melted alloys
[DE86-002916] N86-24819
Method to reveal microstructures in single phase alloys
[AD-D012020] N86-24826
Structural study of multilayered vanadium/nickel superlattices
[DE85-018396] N86-24831
Tailoring multiphase ceramics
[AD-A164010] N86-24855
Effect of forced convection heat transfer on weld pools
[AD-A163970] N86-24998
Positron annihilation studies of very fine structured materials
[AD-A163822] N86-25225
Enthalpies of formation of liquid three-component iron-cerium-aluminium alloys
[BLL-M-36823-(5828.4)] N86-25282
MICROWAVE EMISSION
Generation of free radicals and ions for spacecraft propulsion
[NASA-CR-176672] N86-24751
MICROWAVE EQUIPMENT
Analysis of optically controlled microwave/millimeter wave device structures
[NASA-TM-87246] N86-24907
MICROWAVE LANDING SYSTEMS
Computed centerline MLS (Microwave Landing System) approach demonstration at Washington National Airport
[AD-A163722] N86-24681
MICROWAVE SENSORS
Time domain referencing in intensity modulation fiber optic sensing systems
[NASA-CR-175109] N86-24691
MICROWAVE TUBES
Microwave tube collectors. Collector systems of UHF devices with longitudinal interactions
[NASA-TM-88399] N86-24910
MICROWAVES
Studies on radiative collisional and ultraviolet lasers
[AD-A163901] N86-24982
Molecular absorption of atmospheric species
[AD-A164024] N86-25075
MIDDLE ATMOSPHERE
Geophysical Fluid Dynamics Laboratory activities FY 1985, plans FY 1986
[PB86-113545] N86-25095
MILITARY OPERATIONS
Review and critical analysis: Rolling-element bearings for system life and reliability
[NASA-CR-174710] N86-24991
MILLIMETER WAVES
Analysis of optically controlled microwave/millimeter wave device structures
[NASA-TM-87246] N86-24907
Configuration study of new low-loss MM (Millimeter) wave guiding structures
[AD-A163784] N86-24914
Research on devices for integrated millimeter wave systems
[AD-A163903] N86-24916
The possible importance of synchrotron/inverse Compton losses to explain fast MM-wave and hard X-ray emission of a solar event
[NASA-TM-88659] N86-25316
MILLING (MACHINING)
Particle size reduction of Si3N4 with Si3N4 milling hardware
[NASA-TM-86864-REV] N86-24839
MINERAL DEPOSITS
Improved detector for the measurement of gamma radiation
[PB86-106945] N86-24974
MINERAL METABOLISM
The ecology of irregularly flooded salt marshes of the northeastern Gulf of Mexico: A community profile
[TI86-900237] N86-25068
MINIATURE ELECTRONIC EQUIPMENT
Electron microscopy observation of electrotransport
[AD-A164107] N86-25213
MINICOMPUTERS
Real-time flight test PCM data acquisition monitor
[AD-A164035] N86-24897
Image segmentation using the military specification 1750A
[AD-A164180] N86-25138
Development of a computer aided design package for control system design and analysis for a personal computer (ICECAP-PC), volume 1
[AD-A163940] N86-25152
Benchmark analysis of database architectures: A case study
[PB86-126687] N86-25162
Absolute bounds on set intersection and union sizes from distribution information
[AD-A164025] N86-25199
MINUTEMAN ICBM
Strategic missile (Minuteman) operating and support cost factors
[AD-A163534] N86-24723
MIRRORS
Reverse-wave suppressor mirror effects on CW HF unstable ring laser performance
[AD-A163529] N86-24979
Thermal barrier potential of a tandem mirror
[IPPJ-768] N86-25259
MISSILE BODIES
Stability of spinning ICBM (intercontinental ballistic missile) in first stage boost phase
[AD-A164019] N86-24724
MISSILE COMPONENTS
Non-destructive laser holographic testing of solid propellant for unbonding defects
[AD-A163694] N86-24860
MISSILE CONFIGURATIONS
Numerical flow field calculations for a missile configuration at M = .6
[AD-A164155] N86-24951
MISSILE SYSTEMS
Strategic missile (Minuteman) operating and support cost factors
[AD-A163534] N86-24723
MISSILES
Optimal estimation of target in clutter (CHAFF) from radar
[AD-A164200] N86-24901
MIXING
Dilution jet mixing program, phase 3
[NASA-CR-174884] N86-24938
Routing of high data rate signals using degenerate four wave mixing in BSO
[AD-A163746] N86-25240
MIXTURES
Damping properties os granule-based composite materials
[BLL-M-36692-(5828.4)] N86-24754
A mixture model for unidirectionally fiber-reinforced composites
[AD-A164136] N86-24764
MODAL RESPONSE
The determination of the natural frequencies and mode shapes for anisotropic laminated plates including the effects of shear deformation and rotatory inertia
[AD-A164040] N86-24763
Mathematical correlation of modal parameter identification methods via system realization theory
[NASA-TM-87720] N86-25019
MODELS
Gyro and accelerometer based navigation system for a mobile autonomous robot
[AD-A164036] N86-24682
Airborne bistatic radar limitations and sample calculations
[AD-A163941] N86-24892
Simulation and performance of brushless dc motor actuators
[AD-A163725] N86-24913
Adaptive control, learning, and cost-effective sensor systems for robotics or advanced automation systems
[AD-A163615] N86-24996
Reasoning in real-time for the pilot associate: An examination of a model based approach to reasoning in real-time for artificial intelligence systems using a distributed architecture
[AD-A163947] N86-25171
MODULATION
Study and analysis of AlGaAs/GaA modulation doped field-effect transistors incorporating p-type Schottky gate barriers
[AD-A164103] N86-24922
MODULES
Shuttle-launch triangular space station
[NASA-CASE-10676-1] N86-24729
Development and implementation of the x.25 protocol for the universal network interface device (UNID) 2. Volume 2
[AD-A164042] N86-25134
MODULUS OF ELASTICITY
Non-destructive laser holographic testing of solid propellant for unbonding defects
[AD-A163694] N86-24860
MOIRE INTERFEROMETRY
Dynamic moire interferometry in mechanics research
[DE86-004128] N86-25028
MOISTURE CONTENT
Microenvironmental moisture research
[AD-B157859] N86-25004
The buckling of composite cylindrical panels considering environmental effects
[AD-A163878] N86-25024
An assessment of data quality and quantity from airborne cloud physics projects from 1974 through 1984
[DOT/FAA/CT-85/37] N86-25079
MOISTURE METERS
Ice detector
[NASA-CASE-LAR-13403-1] N86-24673
MOLECULAR ABSORPTION
Molecular absorption of atmospheric species
[AD-A164024] N86-25075
MOLECULAR BEAM EPITAXY
Schottky barrier surface science
[AD-A163574] N86-25275
MOLECULAR BEAMS
Time and state resolved studies of molecular decomposition
[AD-A163881] N86-25227
MOLECULAR CLOUDS
Is G305.8-0.2 a young object?
[INPE-3787-PRE/882] N86-25304
A polarimetric study of the insterstellar medium in Taurus dark clouds N86-25306
MOLECULAR COLLISIONS
Vibrational energy transfer at a liquid gallium surface. Activation of unimolecular cyclobutene isomerization
[AD-A163023] N86-25230
MOLECULAR DIFFUSION
High temperature gas energy transfer
[AD-A163020] N86-25229
MOLECULAR ENERGY LEVELS
High temperature gas energy transfer
[AD-A163020] N86-25229

MOLECULAR EXCITATION
Time and state resolved studies of molecular decomposition
[AD-A163881] N86-25227
Dissociative electron attachment to rovibrationally excited molecules
[AD-A163065] N86-25228
MOLECULAR FLOW
Molecular outflows and mass loss in pre-main-sequence stars N86-25309
MOLECULAR INTERACTIONS
High temperature gas energy transfer
[AD-A163020] N86-25229
MOLECULAR OSCILLATIONS
Dissociative electron attachment to rovibrationally excited molecules
[AD-A163065] N86-25228
High temperature gas energy transfer
[AD-A163020] N86-25229
Vibrational energy transfer at a liquid gallium surface. Activation of unimolecular cyclobutene isomerization
[AD-A163023] N86-25230
A quantum mechanical investigation of vibrational energy transfer in O ((3)P) + H sub 2 O collisions
[AD-A164159] N86-25232
MOLECULAR RELAXATION
Vibrational energy transfer at a liquid gallium surface. Activation of unimolecular cyclobutene isomerization
[AD-A163023] N86-25230
MOLECULAR ROTATION
Dissociative electron attachment to rovibrationally excited molecules
[AD-A163065] N86-25228
MOLECULAR STRUCTURE
Metal cluster topology. Part 3: Platinum carbonyl clusters
[AD-A164241] N86-24830
Crack healing in polymers
[AD-A164130] N86-24856
Energy and chemical change
[AD-A164147] N86-25231
MOLECULAR WEIGHT
Crack healing in polymers
[AD-A164130] N86-24856
Review of modified hemoglobin solutions for use as temporary blood substitutes
[AD-A164210] N86-25114
MOLECULES
Analytic solution of the molecular Ornstein-Zernike equation for non-spherical molecules spheres with anisotropic surface adhesion
[AD-A163451] N86-24771
Determination of initial chemical steps in the gas-phase decomposition of energetic molecules
[AD-A163751] N86-24777
On K-BKZ and other viscoelastic models as continuum generalization of the classical Spring-Dashpot models
[AD-A163703] N86-24943
Time and state resolved studies of molecular decomposition
[AD-A163881] N86-25227
MOLYBDENUM
ACTA Armamentarii (selected articles)
[AD-A163713] N86-24861
MOLYBDENUM COMPOUNDS
Improved piston ring materials for 650 deg C service
[NASA-CR-175058] N86-24845
MOLYBDENUM SULFIDES
The photoelectrochemical properties of MoS sub2 single crystals grown in the presence of cobalt
[AD-A163592] N86-25276
MOMENTUM TRANSFER
Nuclear structure studies by the scattering of medium-energy electrons
[DE86-002265] N86-25234
MONITORS
Real-time flight test PCM data acquisition monitor
[AD-A164035] N86-24897
A seawater battery monitor with fiber optic remote data acquisition capability
[AD-A164178] N86-25052
Absolute bounds on set intersection and union sizes from distribution information
[AD-A164025] N86-25199
Electron microscopy observation of electrotransport
[AD-A164107] N86-25213
A network monitoring facility for a distributed data base management system
[AD-A164129] N86-25297
MONOMERS
Crack healing in polymers
[AD-A164130] N86-24856
MONOPROPELLANTS
Radical fluorescence studies with liquid propellants
[AD-A163472] N86-24857
Technical notes on orifice tests
[AD-A164227] N86-24952
MONTE CARLO METHOD
An improved closure of the Born-Green-Yvon equation for the electric double layer
[AD-A163452] N86-24772
Verification of a Monte Carlo simulation method to find lower confidence limits for the availability and reliability of maintained systems
[AD-A163832] N86-25005
Monte Carlo simulation of two-particle relative diffusion using Eulerian statistics: Extended abstract
[PB86-116548] N86-25077
A comparison of estimation techniques for the three parameter Pareto distribution
[AD-A163831] N86-25192
Modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises tests for the Pareto distribution with unknown location and scale parameters
[AD-A163837] N86-25193
Introduction to kernel density estimation
[AD-A163920] N86-25206
A modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises test for the Cauchy distribution with unknown location and scale parameters
[AD-A164204] N86-25208
MOORING
Physical oceanographic data marginal ice zone experiment R/V POLAR QUEEN, June-July 1984
[AD-A163591] N86-25101
MORALE
Leadership on the flight deck: The influence of crew social relations and crew member experience on leadership style effectiveness in civil aviation flight crews
[CAR-8612] N86-25286
MOTION PICTURES
An experimental study of clustered nozzles with variable shrouds
[AD-A163961] N86-24945
MOTION SIMULATION
Multivariable control law design for enhanced air combat maneuvering. F-15/STOL (Short Take-Off and Landing) derivative fighter
[AD-A164017] N86-24706
MOTIVATION
Man-machine systems of the 1990 decade: Cognitive factors and human interface issues
[AD-A163865] N86-25123
MOTORS
A proposed design for an interim space rescue ferry vehicle
[AD-A164039] N86-24741
Simulation and performance of brushless dc motor actuators
[AD-A163725] N86-24913
MOUNTING
Apparatus for electrical measurements of thin films from 77 to 1000 K
[NASA-TM-87256] N86-24959
Adjustable mount for electro-optic transducers in an evacuated cryogenic system
[NASA-CASE-LAR-13100-1] N86-24993
MTBF
Verification of a Monte Carlo simulation method to find lower confidence limits for the availability and reliability of maintained systems
[AD-A163832] N86-25005
MULTI-ANODE MICROCHANNEL ARRAYS
The development and test of a pulse-counting imaging detector system for solar system studies at ultraviolet and visible wavelengths
[NASA-CR-176671] N86-24965
MULTIBEAM ANTENNAS
DSCS network performance software support. Revision
[AD-A163530] N86-25163
MULTILAYER INSULATION
Non-destructive laser holographic testing of solid propellant for unbonding defects
[AD-A163694] N86-24860
MULTIPATH TRANSMISSION
Time domain algorithms
[AD-A163054] N86-24895
Effects of convergence zone multipath on crosscorrelation
[AD-A163650] N86-25221
MULTIPLE ACCESS
An adaptive collision resolution protocol for random accessed channels
[AD-A164169] N86-25165
MULTIPLEXING
Parallel image transmission through a single optical fiber
[AD-A163809] N86-25241
MULTIPOLES
Quantum theory of ion motion and laser cooling in a radio frequency quadrupole trap
[AD-A163838] N86-25212
MULTIPROCESSING (COMPUTERS)
A single board multiprocessor for real-time contour surface display generation
[AD-A163587] N86-25129
Image segmentation using the military specification 1750A
[AD-A164180] N86-25138
Knowledge-based transformational synthesis of efficient structures for concurrent computation
[AD-A164022] N86-25155
MULTISTATIC RADAR
Airborne bistatic radar limitations and sample calculations
[AD-A163941] N86-24892
MULTIVARIATE STATISTICAL ANALYSIS
Multivariable control law design for enhanced air combat maneuvering. F-15/STOL (Short Take-Off and Landing) derivative fighter
[AD-A164017] N86-24706
LQG/LTR design of a robust flight controller for the STOL F-15
[AD-A164111] N86-24708
Study of the effects of discretizing quantitative feedback theory analog control system designs
[AD-A164209] N86-25174
Solutions of nonlinear matrix equations
[AD-A163841] N86-25195
Exploratory projection pursuit
[AD-A163019] N86-25207
MUON SPIN ROTATION
Search for right-handed currents by means of muon spin rotation
[DE86-002870] N86-25233
MUONS
Search for right-handed currents by means of muon spin rotation
[DE86-002870] N86-25233

N

NASA PROGRAMS
The great observatories for space astrophysics
[NASA-CR-176754] N86-24712
NASA's FIA (National Aeronautics and Space Administration's Financial Integrity Act) Program: NASA's progress in implementing Financial Integrity Act requirements
[PB86-135100] N86-25288
Research and technology, fiscal year 1985
[NASA-TM-88753] N86-25320
NASTRAN
Statistical correlation analysis for comparing vibration data from test and analysis
[NASA-TM-86081] N86-25018
NATIONS
Relying on progress of technology, to develop our alloy steel
[AD-A163690] N86-24825
NATURAL GAS
Degree to which natural gas is dissociated during thermal oxidation pyrolysis
[BLL-M-36630-(5828.4)] N86-24804
Measurement of viscosity of gaseous mixtures at atmospheric pressure
[NASA-TP-2582] N86-24962
NATURAL LANGUAGE (COMPUTERS)
The structures of discourse structure
[AD-A163024] N86-25172
NAVIER-STOKES EQUATION
Stationary motions and incompressible limit for compressible viscous fluids
[AD-A163600] N86-24941
L(2) stability for weak solutions of the Navier-Stokes equations in R(3)
[AD-A163612] N86-24942
Numerical flow field calculations for a missile configuration at M = .6
[AD-A164155] N86-24951
Numerical grid generation for parabolic partial differential equations using marching techniques
[AD-A164020] N86-25198
NAVIGATION
Gyro and accelerometer based navigation system for a mobile autonomous robot
[AD-A164036] N86-24682
NEAR FIELDS
Aircraft Noise Prediction Program theoretical manual: Propeller aerodynamics and noise
[NASA-TM-83199] N86-25220

NEAR INFRARED RADIATION
Remote sensing of atmospheric winds by utilizing speckle-turbulence interaction and optical heterodyne detection
[AD-A164187] N86-25087
NEGATIVE IONS
Dissociative electron attachment to rovibrationally excited molecules
[AD-A163065] N86-25228
NEODYMIUM ALLOYS
Positron annihilation studies of very fine structured materials
[AD-A163822] N86-25225
NETWORK SYNTHESIS
Knowledge-based transformational synthesis of efficient structures for concurrent computation
[AD-A164022] N86-25155
NEUROMUSCULAR TRANSMISSION
Multidisciplinary studies on excitatory amino acids as transmitters in the brain
[AD-A164258] N86-25115
NEURONS
Multidisciplinary studies on excitatory amino acids as transmitters in the brain
[AD-A164258] N86-25115
NEUROTRANSMITTERS
Chemically induced damage to the hippocampal formation
[NDRE/PUBL-86/1002] N86-25112
NEUTRONS
Electromagnetic pulse: The fifth factor in the impact of a nuclear explosion
[AD-A163695] N86-24885
NEWFOUNDLAND
Current variability near the southeast Newfoundland ridge
[AD-A163644] N86-25102
NICKEL
Structural study of multilayered vanadium/nickel superlattices
[DE85-018396] N86-24831
NICKEL ALLOYS
Anisotropy of high temperature strength in precipitation-hardened nickel-base superalloy single crystals
[NASA-TM-88387] N86-24815
Corrosion of nickel and cobalt base alloys in sulfate melts at 750 deg C
[NASA-CR-175111] N86-24817
NICKEL COMPOUNDS
Catalysis of hydrolysis reactions by platinum and nickel phosphine complexes
[AD-A163666] N86-24775
NICKEL HYDROGEN BATTERIES
Long life nickel electrodes for a nickel-hydrogen cell: Cycle life tests
[NASA-CR-174815] N86-25046
Nickel hydrogen battery cell testing data base: An industry and government survey
[AD-A163017] N86-25051
NICKEL OXIDES
Impurity diffusion in NiO grain boundaries
[AERE-R-11763] N86-25280
NIOBIUM
Technology for satellite power conversion
[NASA-CR-176777] N86-25042
NITRIDES
Binders for compacting nitride type ceramics
[NASA-TM-88397] N86-24844
NITROGEN LASERS
An ultraviolet laser shadowgraphy system for the SHIVA-STAR fast capacitor bank
[AD-A163867] N86-24968
NITROGEN OXIDES
Removal of sulfur and nitrogen containing pollutants from discharge gases
[DE85-017799] N86-25058
NITROUS OXIDES
CARS (Coherent Anti-Stokes Raman Scattering) spectroscopy of the reaction zone of methane-nitrous oxide and RDX propellant flames
[AD-A163465] N86-24773
Molecular absorption of atmospheric species
[AD-A164024] N86-25075
NOISE (SOUND)
Prediction of the far field noise from wind energy farms
[NASA-CR-177956] N86-25215
Helicopter rotor noise due to ingestion of atmospheric turbulence
[NASA-CR-3973] N86-25216
An estimate of the enroute noise of an advanced turboprop airplane NASA-TM-87302 E-3020 NAS 1.15:87302 HC A02/MF A01
[NASA-TM-87302] N86-25217
NOISE INTENSITY
An estimate of the enroute noise of an advanced turboprop airplane NASA-TM-87302 E-3020 NAS 1.15:87302 HC A02/MF A01
[NASA-TM-87302] N86-25217
NOISE MEASUREMENT
NCTR using a polarization-agile coherent radar system
[AD-A163528] N86-24882
Comparison of background characteristics of an RCS (Radar Cross Section) measurement range using a CW-Nulling technique and a pulse-gating technique
[AD-A163965] N86-24896
NOISE PREDICTION
Kalman filtering state noise adaptive estimation
[INPE-3790-PRE/885] N86-25202
NOISE PREDICTION (AIRCRAFT)
Jet shielding of jet noise
[NASA-CR-3966] N86-25219
Aircraft Noise Prediction Program theoretical manual: Propeller aerodynamics and noise
[NASA-TM-83199] N86-25220
NOISE PROPAGATION
Prediction of the far field noise from wind energy farms
[NASA-CR-177956] N86-25215
Aircraft Noise Prediction Program theoretical manual: Propeller aerodynamics and noise
[NASA-TM-83199] N86-25220
NOISE REDUCTION
Jet shielding of jet noise
[NASA-CR-3966] N86-25219
NOISE SPECTRA
An estimate of the enroute noise of an advanced turboprop airplane NASA-TM-87302 E-3020 NAS 1.15:87302 HC A02/MF A01
[NASA-TM-87302] N86-25217
NONDESTRUCTIVE TESTS
Non-destructive laser holographic testing of solid propellant for unbonding defects
[AD-A163694] N86-24860
Quantitative non-destructive testing
[NASA-CR-176761] N86-25001
Stress waves in transversely isotropic media: The homogeneous problem
[NASA-CR-3977] N86-25002
NONFLAMMABLE MATERIALS
Fire resistant fuel program analysis and program management documentation
[AD-A163724] N86-24862
NONISENTROPICITY
Nonisentropic unsteady three dimensional small disturbance potential theory
[NASA-TM-87726] N86-24663
NONLINEAR EQUATIONS
A semi-analytic theory for satellite orbit prediction
N86-24718
Analytic solution of the molecular Ornstein-Zernike equation for non-spherical molecules spheres with anisotropic surface adhesion
[AD-A163451] N86-24771
Solutions of nonlinear matrix equations
[AD-A163841] N86-25195
Connecting mathematics, science and high technology: Research on solutions to nonlinear partial differential equations, bifurcation phenomena, and constructive methods for implementing the calculus of variations for relevant, physical problems
[AD-A162827] N86-25197
NONLINEAR FILTERS
Kalman filter design for the long range intercept function of the F-4E/G fire control system
[AD-A164205] N86-24926
NONLINEAR SYSTEMS
Adaptive control techniques for large space structures
[AD-A164240] N86-24742
Stationary motions and incompressible limit for compressible viscous fluids
[AD-A163600] N86-24941
Chaos in laser-matter interactions N86-24989
Modification of the ionospheric electron velocity distribution function due to resonant absorption of HF waves
[AD-A163025] N86-25073
Higher order residual analysis for nonlinear time series with autoregressive correlation structures
[AD-A163611] N86-25185
Maximum likelihood recursion and stochastic approximation in sequential designs
[AD-A163628] N86-25188
Connecting mathematics, science and high technology: Research on solutions to nonlinear partial differential equations, bifurcation phenomena, and constructive methods for implementing the calculus of variations for relevant, physical problems
[AD-A162827] N86-25197
NONLINEARITY
Nonlinear analysis of efficiency enhancement in Ubitron/Free-Electron laser amplifiers
[AD-A163619] N86-24980
A morphological study of waves in the thermosphere using DE-2 observations
[NASA-CR-176775] N86-25070
Higher order residual analysis for nonlinear time series with autoregressive correlation structures
[AD-A163611] N86-25185
Tail anisotropy instability during plasma current rise by lower-hybrid waves in a tokamak
[IPPJ-756] N86-25251
NONPARAMETRIC STATISTICS
Introduction to kernel density estimation
[AD-A163920] N86-25206
NONUNIFORM FLOW
Propulsion and Energetics Panel Working Group 14 on suitable averaging techniques in non-uniform internal flows
[AD-A133968] N86-24692
NORMAL DENSITY FUNCTIONS
Simulation of chaff cloud signature
[AD-A164106] N86-24898
Mechanics of field-consistency in finite element analysis: A penalty function approach
[NAL-TM-ST-8514] N86-25180
NORTHERN HEMISPHERE
Monthly and seasonal weather outlook for mid-November to mid-December 1985, volume 39, number 22, November 14, 1985
[PB86-128097] N86-25090
Monthly and seasonal weather outlook for mid-December 1985 to mid-January 1986, volume 39, number 24, December 14, 1985
[PB86-142262] N86-25091
Monthly and seasonal weather outlook for mid-January to mid-February 1986, volume 40, number 2, January 14, 1986
[PB86-145828] N86-25093
NOTCH TESTS
Analysis of the stress state in an Iosipescu shearest specimen
[NASA-CR-176745] N86-24755
NOZZLE GEOMETRY
Two-dimensional confined jet thrust vector control with flow visualization and variable flow geometry
[AD-A164214] N86-24699
NOZZLES
Crack growth on a PWR-RPV nozzle corner under cyclic thermal shock load
[BLL-RISLEY-TR-5284-(9091.9F)] N86-25016
NUCLEAR EXPLOSION EFFECT
Electromagnetic pulse: The fifth factor in the impact of a nuclear explosion
[AD-A163695] N86-24885
NUCLEAR MAGNETIC RESONANCE
Transport and relaxation processes in supercritical fluids
[DE86-002921] N86-24785
NUCLEAR RADIATION
Nuclear structure studies by the scattering of medium-energy electrons
[DE86-002265] N86-25234
NUCLEAR RADIATION SPECTROSCOPY
A strategy for adoption of accelerator mass spectrometry by the Earth sciences
[TI85-901777] N86-25031
NUCLEAR REACTORS
Laser probing and modification of MOCVD and VPE reactor kinetics
[AD-A163860] N86-24981
Some advances in fracture studies under the Heavy-Section Steel Technology Program
[TI85-018096] N86-25029
NUCLEI (NUCLEAR PHYSICS)
Abundances and energy spectra of high energy heavy cosmic-ray nuclei N86-25319
NULL HYPOTHESIS
Tests for the extreme value and Weibull distributions based on normalized spacings
[AD-A163566] N86-25182
NULL ZONES
Physical optics model of side lobe nulling by discs on a parabolic reflector
[AD-A163826] N86-24889
NUMERICAL ANALYSIS
A model for oxygen atom recombination on a silicon dioxide surface
[AD-A163990] N86-24782
Improved numerical implementation of the bounding surface plasticity model for cohesive soils
[AD-A163572] N86-24870
A schlieren and hot-wire investigation of karman vortex streets
[AD-A164101] N86-24949

Numerical flow field calculations for a missile configuration at M = .6
[AD-A164155] N86-24951
Robust estimation of the location parameter of life distributions
[AD-A163983] N86-25008
FORTRAN program for vibration and sound radiation of spherical shell
[AD-A163752] N86-25022
Improved interval bounds for ranges of functions
[AD-A163627] N86-25187
A new method for computing the generalized inverses of a matrix and its application to the Lyapunov matrix equation
[AD-A163840] N86-25194
Absolute bounds on set intersection and union sizes from distribution information
[AD-A164025] N86-25199
A convergence theorem for Newton's method in Banach spaces
[AD-A163825] N86-25209
Numerical solutions of selected problems which arise in the theory of particle beams
[AD-A164041] N86-25235

NUMERICAL CONTROL
Multivariable control law design for enhanced air combat maneuvering. F-15/STOL (Short Take-Off and Landing) derivative fighter
[AD-A164017] N86-24706

NUMERICAL INTEGRATION
Dynamic and design sensitivity analysis of rigid and elastic mechanical systems with intermittent motion
[AD-A163982] N86-25025

NUMERICAL WEATHER FORECASTING
Evaluation of NOGAPS 2.1 (Navy Operational Global Atmospheric Prediction System 2.1) systematic error - winter 1983 - 1984
[AD-A163812] N86-25082
Applications of wind empirical orthogonal functions in tropical cyclone motion studies
[AD-A164170] N86-25086
ROTODRAW
[PB86-131828] N86-25139

O

O STARS
International Ultraviolet Explorer Atlas of O-typespectra from 1200 to 1900 angstrom
[NASA-RP-1155] N86-25307

OBSERVATION
Electron microscopy observation of electrotransport
[AD-A164107] N86-25213

OCEAN BOTTOM
Relative positioning of ocean bottom benchmarks AD-A164177 HC A05/MF A01
[AD-A164177] N86-24684
Current variability near the southeast Newfoundland ridge
[AD-A163644] N86-25102
A transducer for bottom-scattering measurements
[AD-A163987] N86-25222

OCEAN CURRENTS
Studies related to ocean dynamics. Task 3.2: Aircraft Field Test Program to investigate the ability of remote sensing methods to measure current/wind-wave interactions
[NASA-CR-168349] N86-25100
A compilation of moored current meter and wind recorder data. Volume 38. Long-term upper ocean study (LOTUS) (Moorings 787, 788, 789, 790, 792), April 1983 - May 1984
[AD-A163897] N86-25103

OCEAN SURFACE
Monthly maps of sea level anomalies in the Pacific, 1975 1981. Report on the IGOSS (Integrated Global Ocean Services System) Sea Level Pilot Project
[AD-A163061] N86-25104

OCEANOGRAPHIC PARAMETERS
Outer Continental Shelf Environment Assessment Program: Reports of principal investigators, volume 32
[PB86-134772] N86-25065
Physical oceanographic data marginal ice zone experiment R/V POLAR QUEEN, June-July 1984
[AD-A163591] N86-25101

OCEANOGRAPHY
Geophysical Fluid Dynamics Laboratory activities FY 1985, plans FY 1986
[PB86-113545] N86-25095
Physical oceanographic data marginal ice zone experiment R/V POLAR QUEEN, June-July 1984
[AD-A163591] N86-25101
Management information (Wave Propagation Laboratory, Boulder, Colorado)
[PB86-139524] N86-25106

OCEANS
Centerville Beach. Project completion report
[AD-A163461] N86-25056
Geophysical Fluid Dynamics Laboratory activities FY 1985, plans FY 1986
[PB86-113545] N86-25095

OHMIC DISSIPATION
A morphological study of waves in the thermosphere using DE-2 observations
[NASA-CR-176775] N86-25070

OIL ADDITIVES
Lubricant foaming and aeration study, part 2
[AD-A163696] N86-24849

OILS
Evaluation of Army engine oils in Hydraulic/Power transmission system components
[AD-A163527] N86-24847

OMEGA NAVIGATION SYSTEM
Omega long-term phase advances
[PB85-233211] N86-24902

ON-LINE SYSTEMS
A network monitoring facility for a distributed data base management system
[AD-A164129] N86-25297

ONBOARD DATA PROCESSING
An engineering approach to the use of expert systems technology in avionics applications
[NASA-TM-88263] N86-24687

ONE DIMENSIONAL FLOW
Propulsion and Energetics Panel Working Group 14 on suitable averaging techniques in non-uniform internal flows
[AD-A133968] N86-24692

OPERATING COSTS
Strategic missile (Minuteman) operating and support cost factors
[AD-A163534] N86-24723
A survey of O and S (Operating and Support) cost models
[AD-A163438] N86-25287

OPERATING SYSTEMS (COMPUTERS)
Ground Software Maintenance Facility (GSMF) user's manual. Appendices NASA-CR-178806 NAS 1.26:178806 Rept-41849-G159-026-App HC A05/MF A01
[NASA-CR-178806] N86-25144

OPERATIONAL AMPLIFIERS
Total temperature probe buffer amplifier
[AD-D011967] N86-24969
Design of a digital controller for an ultragravimetric microbalance
[AD-A164014] N86-24971

OPERATORS (MATHEMATICS)
Quantum mechanical atomic energy operator
[AD-A163839] N86-25226

OPTICAL COMMUNICATION
Optical star coupler with large number of inputs and outputs
[NASA-TM-88395] N86-25237

OPTICAL COUPLING
Optical feedback stabilization of laser diodes for passive resonance ring laser gyro applications
[AD-A163942] N86-24983

OPTICAL DATA STORAGE MATERIALS
Optical disk technology for large scale mass storage
[AD-A163453] N86-25127

OPTICAL DISKS
Optical disk technology for large scale mass storage
[AD-A163453] N86-25127

OPTICAL EQUIPMENT
Gyro and accelerometer based navigation system for a mobile autonomous robot
[AD-A164036] N86-24682
Optical studies of electrical discharge-liquid propellant interactions
[AD-A164156] N86-24784
A schlieren and hot-wire investigation of karman vortex streets
[AD-A164101] N86-24949
Routing of high data rate signals using degenerate four wave mixing in BSO
[AD-A163746] N86-25240

OPTICAL GYROSCOPES
Optical feedback stabilization of laser diodes for passive resonance ring laser gyro applications
[AD-A163942] N86-24983

OPTICAL HETERODYNING
Remote sensing of atmospheric winds by utilizing speckle-turbulence interaction and optical heterodyne detection
[AD-A164187] N86-25087

OPTICAL MEMORY (DATA STORAGE)
Optical disk technology for large scale mass storage
[AD-A163453] N86-25127

OPTICAL PROPERTIES
Optical studies of electrical discharge-liquid propellant interactions
[AD-A164156] N86-24784
A comprehensive model of the photophoretic force on a spherical microparticle
[AD-A163022] N86-24894
Chaos in laser-matter interactions N86-24989
Laser interaction in long-scalelength plasmas
[AD-A163604] N86-25262
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163559] N86-25273

OPTICAL PUMPING
Laser probing and modification of MOCVD and VPE reactor kinetics
[AD-A163860] N86-24981

OPTICAL RESONANCE
Optical feedback stabilization of laser diodes for passive resonance ring laser gyro applications
[AD-A163942] N86-24983

OPTICAL SWITCHING
Optical star coupler with large number of inputs and outputs
[NASA-TM-88395] N86-25237

OPTIMAL CONTROL
State estimation procedure based upon the duality concept
[INPE-3796-PRE/891] N86-25179

OPTIMIZATION
A research program in active control/aeroelasticity
[NASA-CR-176773] N86-24702
CADS: A Computer Aided Design System, volume 1
[AD-A163556] N86-25147

ORBIT CALCULATION
An analysis of the accessibility of Earth-approaching asteroids
[AD-A163976] N86-25313

ORBIT SPECTRUM UTILIZATION
Impact of the 1985 Space World Administrative Radio Conference on frequency/orbit planning and use
[NASA-TM-87285] N86-24881

ORBIT TRANSFER VEHICLES
Advanced orbit transfer vehicle propulsion system study
[NASA-CR-174843] N86-24748

ORBITAL MANEUVERING VEHICLES
The detumbling of an axially symmetric satellite with an orbital maneuvering vehicle by nonlinear feedback control
[AD-A163989] N86-24717
Space platform expendables resupply concept definition study. Volume 1: Executive summary
[NASA-CR-178820] N86-24733
Space platform expendables resupply concept definition study, volume 2
[NASA-CR-178821] N86-24734
Space platform expendables resupply concept definition study. Volume 3: Work breakdown structure and work breakdown structure dictionary
[NASA-CR-178822] N86-24735

ORBITAL MECHANICS
Motion in the restricted problem of three bodies for small values of the mass parameter N86-25201

ORBITAL POSITION ESTIMATION
A semi-analytic theory for satellite orbit prediction N86-24718
State estimation procedure based upon the duality concept
[INPE-3796-PRE/891] N86-25179

ORBITAL RENDEZVOUS
An analysis of the accessibility of Earth-approaching asteroids
[AD-A163976] N86-25313

ORBITAL SERVICING
Renewing solar science: The solar maximum repair mission
[NASA-EP-206] N86-24714
Shuttle-launch triangular space station
[NASA-CASE-10676-1] N86-24729

ORBITAL SPACE STATIONS
Space Station Systems: A bibliography with indexes (supplement 1)
[NASA-SP-7056(01)] N86-24711
Shuttle-launch triangular space station
[NASA-CASE-10676-1] N86-24729
Behavioral considerations for space station design
[AD-A163478] N86-25118

ORGANIC MATERIALS
Process for crosslinking methylene-containing aromatic polymers with ionizing radiation
[NASA-CASE-LAR-13448-1] N86-24840

ORGANOMETALLIC POLYMERS
Synthesis of alkyl and aryl phosphazene high polymers
[AD-A163543] N86-24848

Isolation and characterization of an organogallium-arsenic cluster: Crystal structure of ((PhAsH)(R2Ga)(PhAs)6(RGa)4)(R=Me3SiCH2)
[AD-A163485] N86-25271

ORIFICE FLOW
Technical notes on orifice tests
[AD-A164227] N86-24952

ORIFICES
Liquid seeding atomizer
[NASA-CASE-ARC-11631-1] N86-24935

ORTHOPEDICS
A review of the pilot backache problem in the CH113 Labrador helicopter
[AD-A164011] N86-25113

OSCILLATORS
Reliability of navigation service provided by the global positioning system
[AD-A163541] N86-24680

Induced Resonance Electron Cyclotron (IREC) quasi-optical maser
[AD-A164167] N86-24986

OUTPUT
Control of a large space structure using direct output feedback and modal suppression
[AD-A163960] N86-24738

A seawater battery monitor with fiber optic remote data acquisition capability
[AD-A164178] N86-25052

OXIDATION
Influence of oxidation on coefficient of hydrogen diffusion in meraging steels
[BLL-M-36647-(5826.4)] N86-24808

A preliminary study of ester oxidation on an aluminum surface using chemiluminescence
[NASA-TM-87242] N86-24835

Development of a test method to determine potential peroxide content in turbine fuels
[AD-A163590] N86-24858

Method of making a resonator having a desired frequency from a quartz crystal resonator plate
[AD-D012157] N86-24919

Technology for satellite power conversion
[NASA-CR-176777] N86-25042

Development of partial oxidizer/reformer for PAFC power plants
[AD-A163781] N86-25049

Overlayer-induced enhanced oxidation of GaAs surfaces
[AD-A163450] N86-25270

OXIDATION RESISTANCE
Diffusion oxygen barrier coating A02/MF A01
[NASA-CASE-LAR-13474-1-SB] N86-24814

OXIDATION-REDUCTION REACTIONS
A volumetric method for titrimetric analysis of hydrogen peroxide
[AD-A163582] N86-24774

OXIDES
Corrosion of nickel and cobalt base alloys in sulfate melts at 750 deg C
[NASA-CR-175111] N86-24817

OXIDIZERS
Calculated research on the energetic characteristic of TN in composite solid propellant
[AD-A163691] N86-24859

Development of partial oxidizer/reformer for PAFC power plants
[AD-A163781] N86-25049

OXYGEN
A quantum mechanical investigation of vibrational energy transfer in O ((3)P) + H sub 2 O collisions
[AD-A164159] N86-25232

OXYGEN ATOMS
A model for oxygen atom recombination on a silicon dioxide surface
[AD-A163990] N86-24782

OXYGEN RECOMBINATION
A model for oxygen atom recombination on a silicon dioxide surface
[AD-A163990] N86-24782

OXYHEMOGLOBIN
Review of modified hemoglobin solutions for use as temporary blood substitutes
[AD-A164210] N86-25114

OZONE
Molecular absorption of atmospheric species
[AD-A164024] N86-25075

Isotopic study of the inhalation toxicology of oxidants
[PB86-109485] N86-25116

P

P-TYPE SEMICONDUCTORS
Study and analysis of AlGaAs/GaA modulation doped field-effect transistors incorporating p-type Schottky gate barriers
[AD-A164103] N86-24922

PACIFIC OCEAN
Applications of wind empirical orthogonal functions in tropical cyclone motion studies
[AD-A164170] N86-25086

PACKING DENSITY
A dimensional analysis approach for characterizing pryotechnic mixture systems
[AD-A163018] N86-24863

PAIN
A review of the pilot backache problem in the CH113 Labrador helicopter
[AD-A164011] N86-25113

PANEL METHOD (FLUID DYNAMICS)
A numerical analysis applied to high angle of attack three-dimensional inlets
[NASA-TM-87298] N86-24658

USSAERO version D computer program development using ANSI standard FORTRAN 77 and DI-3000 graphics
[NASA-CR-3980] N86-24660

PANELS
The buckling of composite cylindrical panels considering environmental effects
[AD-A163878] N86-25024

PAPER (MATERIAL)
Fire resistant fuel program analysis and program management documentation
[AD-A163724] N86-24862

PARABOLIC DIFFERENTIAL EQUATIONS
Numerical grid generation for parabolic partial differential equations using marching techniques
[AD-A164020] N86-25198

PARABOLIC REFLECTORS
Physical optics model of side lobe nulling by discs on a parabolic reflector
[AD-A163826] N86-24889

PARALLEL PROCESSING (COMPUTERS)
Parallel processing of region boundaries
[AD-A164112] N86-25157

Combining and connecting linear, multi-input, multi-output subsystem models
[NASA-TM-85912] N86-25166

Reasoning in real-time for the pilot associate: An examination of a model based approach to reasoning in real-time for artificial intelligence systems using a distributed architecture
[AD-A163947] N86-25171

PARAMAGNETISM
Investigation of paramagnetic response of metallic epoxies
[NASA-CR-176551] N86-24761

PARAMETER IDENTIFICATION
Estimation of ICBM (intercontinental ballistic missile) performance parameters
[AD-A164021] N86-24725

Mathematical correlation of modal parameter identification methods via system realization theory
[NASA-TM-87720] N86-25019

A database for compounding stress intensity factors
[AD-A163779] N86-25023

Nonparametric and parametric estimation of wave statistics and spectra
[PB86-141967] N86-25105

PARITY
Generalized parity relations for large space structures with uncertain parameters
[NASA-CR-176762] N86-24730

Search for right-handed currents by means of muon spin rotation
[DE86-002870] N86-25233

PARTIAL DIFFERENTIAL EQUATIONS
On the two-phase Stefan problem with interfacial energy and entropy
[AD-A163715] N86-25211

PARTICLE ACCELERATORS
Volume produced H(-), D(-) ion source for proton accelerator and thermo-nuclear fusion research by sheet plasma (1)
[IPPJ-760] N86-25253

PARTICLE BEAMS
Numerical solutions of selected problems which arise in the theory of particle beams
[AD-A164041] N86-25235

PARTICLE COLLISIONS
Studies on radiative collisional and ultraviolet lasers
[AD-A163901] N86-24982

A quantum mechanical investigation of vibrational energy transfer in O ((3)P) + H sub 2 O collisions
[AD-A164159] N86-25232

PARTICLE DENSITY (CONCENTRATION)
Advanced artificial dielectric materials for millimeter wavelength applications. Part A
[AD-A164195] N86-24925

PARTICLE DIFFUSION
A plasma wave instrument on the AMPTE/IRM (Active Magnetospheric Particle Tracing Explorers/Ion Release Module) spacecraft
[AD-A163048] N86-25074

Monte Carlo simulation of two-particle relative diffusion using Eulerian statistics: Extended abstract
[PB86-116548] N86-25077

PARTICLE EMISSION
Search for right-handed currents by means of muon spin rotation
[DE86-002870] N86-25233

PARTICLE MOTION
A solidary wave of a relativistic magnetosonic wave propagating perpendicularly to a magnetic field
[IPPJ-767] N86-25260

PARTICLE PRECIPITATION
Omega long-term phase advances
[PB85-233211] N86-24902

Electron precipitation patterns in the vicinity of a VLF transmitter
[AD-A163716] N86-25072

PARTICLE SIZE DISTRIBUTION
Criteria for significance of simultaneous presence of both condensible vapors and aerosol particles on mass transfer (deposition) rates
[NASA-TM-87247] N86-24869

Characterization of simulated small-droplet fuel sprays
[NASA-TM-87266] N86-24961

PARTICLE SPIN
Search for right-handed currents by means of muon spin rotation
[DE86-002870] N86-25233

PARTICLES
Criteria for significance of simultaneous presence of both condensible vapors and aerosol particles on mass transfer (deposition) rates
[NASA-TM-87247] N86-24869

PASCAL (PROGRAMMING LANGUAGE)
Computer assisted instruction for the C programming language on the Zenith Z-100 microcomputer system AFIT/GCS/MA/85D-2 HC A11/MF A01
[AD-A163842] N86-25150

PATENT APPLICATIONS
Removal of sulfur and nitrogen containing pollutants from discharge gases
[DE85-017799] N86-25056

PELLETS
Active diagnostics of magnetically confined alpha particles by pellet injection
[IPPJ-757] N86-25252

PERFORMANCE PREDICTION
Propulsion and Energetics Panel Working Group 14 on suitable averaging techniques in non-uniform internal flows
[AD-A133968] N86-24692

PERFORMANCE TESTS
Designing a 25-kilowatt high frequency series resonant
[NASA-CR-176774] N86-24906

Behaviour of dynamically loaded pipes with circumferential flaws under internal pressure and external bending loads
[BLL-RISLEY-TR-5278-(9091.9F)] N86-25010

Stirling Powered Van Progam overview
[NASA-TM-87227] N86-25303

PERIODIC VARIATIONS
Monthly and seasonal weather outlook for January 1986, volume 40, number 1, December 31, 1985
[PB86-142270] N86-25092

PERIODICALS
European Science Notes, Volume 40, Number 3 ESN-40-3 HC A03/MF A01
[AD-A164182] N86-25298

PERMITTIVITY
Advanced artificial dielectric materials for millimeter wavelength applications. Part A
[AD-A164195] N86-24925

PEROXIDES
Development of a test method to determine potential peroxide content in turbine fuels
[AD-A163590] N86-24858

PERSONAL COMPUTERS
Development of a computer aided design package for control system design and analysis for a personal computer (ICECAP-PC), volume 1
[AD-A163940] N86-25152

Development of a computer aided design package for control system design and analysis for a personal computer (ICECAP-PC). Volume 2
[AD-A164044] N86-25156
PERSONNEL
A proposed design for an interim space rescue ferry vehicle
[AD-A164039] N86-24741
The effect of cold training and the wearing of gloves on manual performance in the cold: A comparison of pure ability and operational tasks
[AD-A163893] N86-25124
PERTURBATION
A morphological study of waves in the thermosphere using DE-2 observations
[NASA-CR-176775] N86-25070
Modification of the ionospheric electron velocity distribution function due to resonant absorption of HF waves
[AD-A163025] N86-25073
PERTURBATION THEORY
Competing unimolecular reactions of flame radicals. Part 1: Isomerization and dissociation of the methoxy radical
[AD-A164154] N86-24783
PETROLEUM PRODUCTS
Mechanisms of combustion of hydrocarbon/alcohol fuel blends
[AD-A163737] N86-24776
PETROLOGY
Chemical, petrographic and K-Ar age data to accompany reconnaissance geologic strip map from Kingman to South of Bill Williams Mountain, Arizona
[DE85-014242] N86-25035
PHASE CONTROL
Low pass filters with linear phase
[AD-A163984] N86-24920
PHASE TRANSFORMATIONS
Influence on wear of translational velocity of specimens during laser borizing of steel
[BLL-M-36646-(5828.4)] N86-24809
Study of phase distribution in unstable austenite steel using thermoelectromotive forces
[BLL-M-36644-(5828.4)] N86-24811
On the two-phase Stefan problem with interfacial energy and entropy
[AD-A163715] N86-25211
Introduction to free atoms and particles
[AD-A163586] N86-25224
PHASE VELOCITY
Stress waves in transversely isotropic media: The homogeneous problem
[NASA-CR-3977] N86-25002
PHASED ARRAYS
Satellite voice broadcast system study, volume 2
[NASA-CR-174905] N86-24877
PHENOLS
Protected ethynlated phenols
[AD-D012019] N86-24854
PHENYLS
Protected ethynlated phenols
[AD-D012019] N86-24854
PHOSPHAZENE
Synthesis of alkyl and aryl phosphazene high polymers
[AD-A163543] N86-24848
PHOSPHIDES
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163537] N86-25272
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163559] N86-25273
PHOSPHINES
Catalysis of hydrolysis reactions by platinum and nickel phosphine complexes
[AD-A163666] N86-24775
PHOSPHORIC ACID FUEL CELLS
Development of 3 and 5 kW fuel cell power plants
[AD-A163603] N86-25047
PHOSPHORS
Flat-panel, full-color electroluminescent display
[NASA-CASE-LAR-13407-1] N86-24909
PHOTOCATHODES
Shuttering efficiencies of nanosecond-gated photoemissive shutter tubes
[DE85-015728] N86-25248
PHOTOCHEMICAL OXIDANTS
Atmospheric modeling: Model and accuracy
[PB86-126663] N86-25062
PHOTOCHEMICAL REACTIONS
Energy transfer and photochemistry in biomimetic solar conversion
[PB86-142114] N86-25054
Time and state resolved studies of molecular decomposition
[AD-A163861] N86-25227
PHOTOELECTRIC EFFECT
B and V photoelectric photometry and light curve solution of the interacting binary systems Hi Puppis,BI Eridani and Sy Horologii N86-25314
PHOTOELECTRIC EMISSION
Overlayer-induced enhanced oxidation of GaAs surfaces
[AD-A163450] N86-25270
PHOTOELECTROCHEMISTRY
The photoelectrochemical properties of MoS sub2 single crystals grown in the presence of cobalt
[AD-A163592] N86-25276
PHOTOELECTRON SPECTROSCOPY
Schottky barrier surface science
[AD-A163574] N86-25275
PHOTOGRAMMETRY
Earth resources: A continuing bibliography with indexes (issue 49)
[NASA-SP-7041(49)] N86-25033
PHOTOGRAPHIC FILM
A gated microchannel plate image intensifier packaged in a reflex camera back
[AD-A163015] N86-24970
PHOTOGRAPHS
An experimental study of clustered nozzles with variable shrouds
[AD-A163961] N86-24945
Image segmentation using the military specification 1750A
[AD-A164180] N86-25138
PHOTOIONIZATION
Non-linear optical techniques for visible and UV lasers and thin film deposition
[AD-A164188] N86-24828
PHOTOMETERS
Laser-photodetector timing station instruction and maintenance manual
[NASA-CR-178835] N86-24720
PHOTOOXIDATION
Catalysis of hydrolysis reactions by platinum and nickel phosphine complexes
[AD-A163666] N86-24775
PHOTOPHORESIS
A comprehensive model of the photophoretic force on a spherical microparticle
[AD-A163022] N86-24894
PHOTOSYNTHESIS
Energy transfer and photochemistry in biomimetic solar conversion
[PB86-142114] N86-25054
PHOTOVOLTAIC CELLS
Silicon production in a fluidized bed reactor
[JPL-PUBL-86-17] N86-25043
Environmental tests of metallization systems for terrestrial photovoltaic cells
[JPL-PUBL-85-86] N86-25045
PHYSICAL EXERCISE
Physical, anthropometrical, and body composition characteristics of workers at Kennedy Space Center
[NASA-TM-83102] N86-25122
PHYSICAL FITNESS
Physical, anthropometrical, and body composition characteristics of workers at Kennedy Space Center
[NASA-TM-83102] N86-25122
PHYSICAL OPTICS
Physical optics model of side lobe nulling by discs on a parabolic reflector
[AD-A163826] N86-24869
PHYSIOLOGICAL RESPONSES
Review of modified hemoglobin solutions for use as temporary blood substitutes
[AD-A164210] N86-25114
Physical, anthropometrical, and body composition characteristics of workers at Kennedy Space Center
[NASA-TM-83102] N86-25122
PHYSIOLOGICAL TESTS
Unsteady solution of the boundary layer equations with application to space shuttle tiles
[AD-A164105] N86-24727
PILOT ERROR
Use of state estimation to calculate angle-of-attack position error from flight test data
[AD-A163962] N86-24670
PILOT PERFORMANCE
Loads and motions of an F-106B flying through thunderstorms
[NASA-TM-87671] N86-24672
PIPELINES
Centerville Beach. Project completion report
[AD-A163461] N86-25056
PIPES (TUBES)
Liquid seeding atomizer
[NASA-CASE-ARC-11631-1] N86-24935
Behaviour of dynamically loaded pipes with circumferential flaws under internal pressure and external bending loads
[BLL-RISLEY-TR-5278-(9091.9F)] N86-25010
Behaviour of WB 35 pipe steel under dynamic loading in high-speed tensile tests
[BLL-RISLEY-TR-5279-(9091.9F)] N86-25011
Centerville Beach. Project completion report
[AD-A163461] N86-25056
PISTON ENGINES
Improved piston ring materials for 650 deg C service
[NASA-CR-175058] N86-24845
Evaluation of Army engine oils in Hydraulic/Power transmission system components
[AD-A163527] N86-24847
PISTONS
Experimental assessment of advanced Stirling component concepts
[NASA-CR-174994] N86-25302
PITCH (INCLINATION)
Use of state estimation to calculate angle-of-attack position error from flight test data
[AD-A163962] N86-24670
Swashplate control system
[NASA-CASE-ARC-11633-1] N86-24700
An empirical study of flight control software reliability
[NASA-CR-178058] N86-25145
PITCHING MOMENTS
Experimental assessment of vortex retaining cavity flaps for maneuverability improvement on delta wing fighter aircraft
[AD-A164104] N86-24690
PLANAR STRUCTURES
Metal cluster topology. Part 3: Platinum carbonyl clusters
[AD-A164241] N86-24830
PLANE WAVES
Reciprocity calibration in a plane wave resonator
[AD-A164149] N86-24972
PLANET EPHEMERIDES
Motion in the restricted problem of three bodies for small values of the mass parameter N86-25201
PLANETARY ENVIRONMENTS
Research in particles and fields
[NASA-CR-176763] N86-25017
PLANETARY EVOLUTION
Molecular outflows and mass loss in pre-main-sequence stars N86-25309
PLASMA CONTROL
Lectures on topics in magnetic reconnection and transport in fusion devices
[IPPJ-762] N86-25255
The influence of a hot particle component on plasma stability
[IPPJ-755] N86-25256
Proceedings of Topical Meeting on Particle Beam Fusion and its Related Problems, volume 1
[IPPJ-769-VOL-1] N86-25258
Measurement of density fluctuations on the JIPP T-II tokamak plasma by millimeter and sub-millimeter wave scattering
[IPPJ-766] N86-25261
Energy confinement studies of lower hybrid current driven discharges in the Alcator C tokamak
[DE85-014754] N86-25263
PLASMA CURRENTS
Tail anisotropy instability during plasma current rise by lower-hybrid waves in a tokamak
[IPPJ-756] N86-25251
Volume produced H(-), D(-) ion source for proton accelerator and thermo-nuclear fusion research by sheet plasma (1)
[IPPJ-760] N86-25253
PLASMA DENSITY
An ultraviolet laser shadowgraphy system for the SHIVA-STAR fast capacitor bank
[AD-A163867] N86-24968
Active diagnostics of magnetically confined alpha particles by pellet injection
[IPPJ-757] N86-25252
Measurement of density fluctuations on the JIPP T-II tokamak plasma by millimeter and sub-millimeter wave scattering
[IPPJ-766] N86-25261
Energy confinement studies of lower hybrid current driven discharges in the Alcator C tokamak
[DE85-014754] N86-25263
PLASMA DIAGNOSTICS
An ultraviolet laser shadowgraphy system for the SHIVA-STAR fast capacitor bank
[AD-A163867] N86-24968
Active diagnostics of magnetically confined alpha particles by pellet injection
[IPPJ-757] N86-25252

PLASMA DIODES
Auger electron spectroscopy, secondary ion mass spectroscopy and optical characterization of a-C-H and BN films
[NASA-TM-87258] N86-25268
PLASMA EQUILIBRIUM
Lectures on topics in magnetic reconnection and transport in fusion devices
[IPPJ-762] N86-25255
PLASMA INTERACTIONS
A plasma wave instrument on the AMPTE/IRM (Active Magnetospheric Particle Tracing Explorers/Ion Release Module) spacecraft
[AD-A163048] N86-25074
PLASMA TURBULENCE
Theoretical studies of magnetized plasma turbulence: Ion-cyclotron turbulence, and shear flow turbulence and its applications to tokamak edge phenomena
N86-25265
PLASMA WAVES
A plasma wave instrument on the AMPTE/IRM (Active Magnetospheric Particle Tracing Explorers/Ion Release Module) spacecraft
[AD-A163048] N86-25074
Tail anisotropy instability during plasma current rise by lower-hybrid waves in a tokamak
[IPPJ-756] N86-25251
PLASMA-PARTICLE INTERACTIONS
The influence of a hot particle component on plasma stability
[IPPJ-755] N86-25256
PLASMAS (PHYSICS)
Optical studies of electrical discharge-liquid propellant interactions
[AD-A164156] N86-24784
Plasma observations in the auroral and polar cap region
[AD-A163654] N86-25071
Kink stability of long ion layers
[IPPJ-758] N86-25250
PLASTIC AIRCRAFT STRUCTURES
Frameless transparencies for aircraft cockpit enclosures
[AD-D012155] N86-24689
PLASTIC DEFORMATION
Mathematical model of temperature conditions of cooling of metal during plastic deformation
[BLLD-5828.4-M-36663] N86-24798
Method of producing a three-dimensional coordinate grid
[BLLD-5828.4-M-36664] N86-24799
Influence of parameters of microstructure on process of hot deformation of two-phase steel
[BLL-M-36626-(5828.4)] N86-24805
Study of phase distribution in unstable austenite steel using thermoelectromotive forces
[BLL-M-36644-(5828.4)] N86-24811
PLASTIC PROPERTIES
Reasons for low plasticity of steel of Type 25-20
[BLL-36604-SER-M-5828.4] N86-24790
Improved numerical implementation of the bounding surface plasticity model for cohesive soils
[AD-A163572] N86-24870
PLASTICIZERS
PES (plasticizer) levels of a BSL 914 resin (CEAT C76 reference) from different standards
[PB86-120854] N86-24789
PLASTICS
Centerville Beach. Project completion report
[AD-A163461] N86-25056
PLATES (STRUCTURAL MEMBERS)
Static and dynamic tensile tests on wide X 6 CrNi 18 11 steel plates to demonstrate the integrity of the reactor tank for the SNR 300 fast sodium-cooled reactor
[BLL-RISLEY-TR-5280-(9091.9F)] N86-25009
Experimental assessment of advanced Stirling component concepts
[NASA-CR-174994] N86-25302
PLATINUM
Catalysis of hydrolysis reactions by platinum and nickel phosphine complexes
[AD-A163666] N86-24775
PLATINUM COMPOUNDS
Metal cluster topology. Part 3: Platinum carbonyl clusters
[AD-A164241] N86-24830
PLOTTING
The determination of the natural frequencies and mode shapes for anisotropic laminated plates including the effects of shear deformation and rotatory inertia
[AD-A164040] N86-24763
PLUGS
Optical studies of electrical discharge-liquid propellant interactions
[AD-A164156] N86-24784
PLUMES
A Model of Airflow and Diffusion In Complex Terrain (MADICT)
[AD-A163819] N86-25083
POINT DEFECTS
Theoretical investigation of point defects of mercury cadmium telluride A01
[AD-A163735] N86-25277
POINTS (MATHEMATICS)
Poisson approximation of Bernoulli point processes and their superpositions, via coupling
[AD-A163442] N86-25181
POISSON DENSITY FUNCTIONS
An improved closure of the Born-Green-Yvon equation for the electric double layer
[AD-A163452] N86-24772
Poisson approximation of Bernoulli point processes and their superpositions, via coupling
[AD-A163442] N86-25181
POISSON EQUATION
POSSOL: Poisson equation solver
[DE86-002292] N86-25160
Poisson approximation of Bernoulli point processes and their superpositions, via coupling
[AD-A163442] N86-25181
POLAR CAPS
Omega long-term phase advances
[PB85-233211] N86-24902
A morphological study of waves in the thermosphere using DE-2 observations
[NASA-CR-176775] N86-25070
Plasma observations in the auroral and polar cap region
[AD-A163654] N86-25071
POLAR REGIONS
Plasma observations in the auroral and polar cap region
[AD-A163654] N86-25071
A definition study of an Advanced Data Collection and Location System (ADCLS)
[NASA-CR-177867] N86-25291
POLARIMETERS
A polarimetric study of the insterstellar medium in Taurus dark clouds N86-25306
POLARIZATION (WAVES)
A polarimetric study of the insterstellar medium in Taurus dark clouds N86-25306
POLES (SUPPORTS)
Low pass filters with linear phase
[AD-A163984] N86-24920
POLISHING
Method to reveal microstructures in single phase alloys
[AD-D012020] N86-24826
POLLUTION CONTROL
Controlling nonpoint pollution in Virginia's urbanizing areas: An institutional perspective
[AD-A163693] N86-25057
Removal of sulfur and nitrogen containing pollutants from discharge gases
[DE85-017799] N86-25058
Outer Continental Shelf Environmental Assessment Program. Reports of principal investigators, volume 33
[PB86-134780] N86-25061
The behavior of cloud droplets in an acoustic field: A numerical investigation
[AD-A163704] N86-25081
POLLUTION TRANSPORT
Criteria for significance of simultaneous presence of both condensible vapors and aerosol particles on mass transfer (deposition) rates
[NASA-TM-87247] N86-24869
Description of a two-dimensional atmospheric transport model
[DAR-TP-11] N86-25055
Modeling transport by convective clouds for regional air pollution models
[PB86-144623] N86-25060
Atmospheric modeling: Model and accuracy
[PB86-128683] N86-25062
POLYATOMIC MOLECULES
Energy and chemical change
[AD-A164147] N86-25231
POLYCARBONATES
Poly(carbonate-mide) polymer
[NASA-CASE-LAR-13292-1] N86-24841
POLYCRYSTALS
Abrasion and deformed layer formation of manganese-zinc ferrite in sliding contact with lapping tapes
[NASA-TM-87249] N86-24838
Impurity diffusion in NiO grain boundaries
[AERE-R-11763] N86-25280
POLYETHER RESINS
PES (plasticizer) levels of a BSL 914 resin (CEAT C76 reference) from different standards
[PB86-120854] N86-24789
POLYETHYLENES
Process for producing an electrode membrane unit for hydrogen/bromine cells
[NASA-TM-88396] N86-25041
Centerville Beach. Project completion report
[AD-A163461] N86-25056
POLYIMIDES
Poly(carbonate-mide) polymer
[NASA-CASE-LAR-13292-1] N86-24841
POLYMER PHYSICS
Crack healing in polymers
[AD-A164130] N86-24856
POLYMERIC FILMS
Physico-chemical factors affecting hydrothermal resistance and bonding of polymeric composites to steel surfaces
[AD-A163906] N86-24852
POLYMERIZATION
Process for crosslinking methylene-containing aromatic polymers with ionizing radiation
[NASA-CASE-LAR-13448-1] N86-24840
Synthesis of alkyl and aryl phosphazene high polymers
[AD-A163543] N86-24848
Introduction to free atoms and particles
[AD-A163586] N86-25224
POLYNOMIALS
A proof of Grace's theorem by induction
[AD-A163714] N86-25191
Solutions of nonlinear matrix equations
[AD-A163841] N86-25195
POLYTETRAFLUOROETHYLENE
Thermal desorption study of physical forces at the PTFE surface
[NASA-TM-87090] N86-25284
POPULATION THEORY
Characterization of the consistent weighted regression estimators
[AD-A163605] N86-25183
POPULATIONS
Outer Continental Shelf Enviromental Assessment Program: Reports of principal investigators, volume 30
[PB86-134756] N86-25063
Bias and efficiency of the consistent weighted regression estimators in finite population sampling HC A03/MF A01
[AD-A163601] N86-25203
PORTABLE EQUIPMENT
Research animal stanchion and transporter
[AD-A163907] N86-25110
POSITION (LOCATION)
Use of state estimation to calculate angle-of-attack position error from flight test data
[AD-A163962] N86-24670
Flat plate and turbine vane cascade heat transfer investigation using a shock tube
[AD-A163992] N86-24947
Robust estimation of the location parameter of life distributions
[AD-A163993] N86-25008
Applications of wind empirical orthogonal functions in tropical cyclone motion studies
[AD-A164170] N86-25086
A modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises test for the Cauchy distribution with unknown location and scale parameters
[AD-A164204] N86-25208
POSITION INDICATORS
Set-up and demonstration of a Low Energy Electron Magnetometer (LEEM)
[NASA-CR-178091] N86-24963
POSITIONING
Relative positioning of ocean bottom benchmarks AD-A164177 HC A05/MF A01
[AD-A164177] N86-24684
POSITRON ANNIHILATION
Positron annihilation studies of very fine structured materials
[AD-A163822] N86-25225
POSITRONS
Positron annihilation studies of very fine structured materials
[AD-A163822] N86-25225
POTENTIAL ENERGY
The thermodynamic particulars of amorphous cobalt alloys
[BLLD-5828.4-M-36658] N86-24797
POTENTIAL FLOW
A numerical analysis applied to high angle of attack three-dimensional inlets
[NASA-TM-87298] N86-24658

USSAERO version D computer program development using ANSI standard FORTRAN 77 and DI-3000 graphics
[NASA-CR-3980] N86-24660

POWDER (PARTICLES)
Particle size reduction of Si3N4 with Si3N4 milling hardware
[NASA-TM-86864-REV] N86-24839

POWDER METALLURGY
Advanced processing and properties of high performance alloys
[AD-A163469] N86-24820
Advanced artificial dielectric materials for millimeter wavelength applications. Part A
[AD-A164195] N86-24925

POWDERED ALUMINUM
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 1. Sections 1 to 8
[AD-A163670] N86-24822
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 2: Appendices A3, A4, A6, A8
[AD-A163671] N86-24823

POWER CONDITIONING
Development of 3 and 5 kW fuel cell power plants
[AD-A163603] N86-25047

POWER CONVERTERS
Space station 20-kHz power management and distribution system
[NASA-TM-87314] N86-24747

POWER EFFICIENCY
Calibration of test systems for measuring power losses of transformers
[PB86-132032] N86-24928
Radio-frequency power delivery system: Procedures for error analysis and self-calibration
[PB86-115680] N86-24929

POWER SPECTRA
Abundances of heavy cosmic rays at energies up to 1000 GeV/amu N86-25318

PRE-MAIN SEQUENCE STARS
Molecular outflows and mass loss in pre-main-sequence stars N86-25309

PREAMPLIFIERS
A transducer for bottom-scattering measurements
[AD-A163987] N86-25222

PREBURNERS
A computational study of multiple jet and wall interaction
[NASA-TM-86541] N86-24937
Investigation of breadboard temperature profiling system for SSME fuel preburner diagnostics
[NASA-CR-178799] N86-24957

PRECIPITATION (CHEMISTRY)
Synthesis and properties of elevated temperature P/M aluminum alloys
[AD-A164158] N86-24827

PRECIPITATION (METEOROLOGY)
Water jet/spray measurement analysis
[NASA-CR-178802] N86-24930
The behavior of cloud droplets in an acoustic field: A numerical investigation
[AD-A163704] N86-25081
Satellite cloud and precipitation analysis using a minicomputer
[AD-A163821] N86-25084
Monthly and seasonal weather outlook for mid-November to mid-December 1985, volume 39, number 22, November 14, 1985
[PB86-128097] N86-25090
Monthly and seasonal weather outlook for mid-December 1985 to mid-January 1986, volume 39, number 24, December 14, 1985
[PB86-142262] N86-25091
Monthly and seasonal weather outlook for January 1986, volume 40, number 1, December 31, 1985
[PB86-142270] N86-25092
Monthly and seasonal weather outlook for mid-January to mid-February 1986, volume 40, number 2, January 14, 1986
[PB86-145828] N86-25093
National Weather Service (NWS) Southern Region QPF (Quantitative Precipitation Forecasting) Workshop
[PB85-199164] N86-25094

PRECIPITATION HARDENING
Anisotropy of high temperature strength in precipitation-hardened nickel-base superalloy single crystals
[NASA-TM-88387] N86-24815

PRECISION
The science of and advanced technology for cost-effective manufacture of high precision engineering products. Volume 4. Thermal effects on the accuracy of numerically controlled machine tool
[AD-A163596] N86-24871

PREDICTION ANALYSIS TECHNIQUES
Analysis of the gain-coupled distributed feedback laser as a source of short optical pulses N86-24987
Life prediction and constitutive models for engine hot section anisotropic materials program
[NASA-CR-174952] N86-25003
Evaluation of NOGAPS 2.1 (Navy Operational Global Atmospheric Prediction System 2.1) systematic error - winter 1983 - 1984
[AD-A163812] N86-25082
Applications of wind empirical orthogonal functions in tropical cyclone motion studies
[AD-A164170] N86-25086
A comparison of estimation techniques for the three parameter Pareto distribution
[AD-A163831] N86-25192
Exploratory projection pursuit
[AD-A163019] N86-25207

PREDICTIONS
Altitude ignition/lean decel study
[AD-A163052] N86-24781
Data sources for parameters used in predictive modeling of fire growth and smoke spread
[PB86-130986] N86-24788
Satellite voice broadcast. Volume 1: Executive summary
[NASA-CR-175016] N86-24875

PRESIDENTIAL REPORTS
Report of the Presidential Commission on the Space Shuttle Challenger Accident, volume 1 N86-24726

PRESSING (FORMING)
Compacting kinetics of metal powders during pressing
[BLLD-5828.4-M-36666] N86-24800
Improved consolidation of silicon carbide
[NASA-TM-87243] N86-24836
Manufacture of ceramic sinters
[NASA-TM-88398] N86-24842

PRESSURE DISTRIBUTION
USSAERO version D computer program development using ANSI standard FORTRAN 77 and DI-3000 graphics
[NASA-CR-3980] N86-24660
Laser beam duct pressure controller system
[AD-D012017] N86-24984

PRESSURE MEASUREMENT
Dynamic measurement of total temperature, pressure and velocity in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TP-2584] N86-24709

PRESSURE REGULATORS
Laser beam duct pressure controller system
[AD-D012017] N86-24984

PRESSURE VESSELS
Crack growth on a PWR-RPV nozzle corner under cyclic thermal shock load
[BLL-RISLEY-TR-5284-(9091.9F)] N86-25016
Some advances in fracture studies under the Heavy-Section Steel Technology Program
[TI85-018096] N86-25029

PRESSURIZED WATER REACTORS
Crack growth on a PWR-RPV nozzle corner under cyclic thermal shock load
[BLL-RISLEY-TR-5284-(9091.9F)] N86-25016

PROBABILITY DENSITY FUNCTIONS
A comparison of estimation techniques for the two parameter Cauchy distribution
[AD-A163833] N86-25205

PROBABILITY DISTRIBUTION FUNCTIONS
Simulation of chaff cloud signature
[AD-A164106] N86-24898
Modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises tests for the Pareto distribution with unknown location and scale parameters
[AD-A163837] N86-25193
Preliminary kalman filter design to improve air combat maneuvering target estimation for the F-4E/G fire control system
[AD-A164034] N86-25200
A modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises test for the Cauchy distribution with unknown location and scale parameters
[AD-A164204] N86-25208

PROBABILITY THEORY
Jamming effects on digital communication receivers (timing errors and frequency errors)
[AD-A164199] N86-24900
Poisson approximation of Bernoulli point processes and their superpositions, via coupling
[AD-A163442] N86-25181
A fuzzy set approach to vulnerability analysis AD-A163921 BRL-TR-2697 HC A03/MF A01
[AD-A163921] N86-25196

PROBLEM SOLVING
Reasoning in real-time for the pilot associate: An examination of a model based approach to reasoning in real-time for artificial intelligence systems using a distributed architecture
[AD-A163947] N86-25171
Decision procedures
[AD-A163049] N86-25173
The Chinese Remainder Problem and polynomial interpolation
[AD-A163626] N86-25186

PROCEDURES
Transverse microsections of thin oxide scales for AEM studies
[AERE-R-11266] N86-24833

PRODUCT DEVELOPMENT
Evaluating R and D and new product development ventures: An overview of assessment methods $12.00/MF A01
[PB86-110806] N86-25289

PROGRAM VERIFICATION (COMPUTERS)
Aerosol behavior modeling. Task 3: Support services for research and evaluation of severe accident phenomena and mitigation
[TI86-900242] N86-25067

PROGRAMMING LANGUAGES
Mode S data link phase coding
[AD-A163745] N86-24886
A microcomputer-based menu-driven chip layout language
[AD-A164109] N86-24923
Introduction to the microcomputers for solving radar and electronic warfare problems
[AD-A164143] N86-25135
The RAND-ABEL (Trademark) programming language: Reference manual
[AD-A163564] N86-25148
Using Ada in the real-time avionics environment issues and conclusions
[AD-A163844] N86-25151
The design and implementation of a relational to network query translator for a distributed database management system
[AD-A164013] N86-25296

PROJECT MANAGEMENT
Fire resistant fuel program analysis and program management documentation
[AD-A163724] N86-24862

PROJECT PLANNING
Science policy study. Volume 7: International cooperation in science
[GPO-52-283] N86-25301

PROJECTILES
Measurement of interior ballistic performance using FM/FM radio telemetry techniques
[AD-A164150] N86-24728
Detection and location of ballistic damage in composite materials using acoustic emission methods
[AD-A164183] N86-24766

PROP-FAN TECHNOLOGY
Advanced turboprop vibratory characteristics
[NASA-CR-174708] N86-24693
Evaluation of propfan propulsion applied to general aviation
[NASA-CR-175020] N86-24695

PROPELLANT COMBUSTION
Radical fluorescence studies with liquid propellants
[AD-A163472] N86-24857
Calculated research on the energetic characteristic of TN in composite solid propellant
[AD-A163691] N86-24859
A dimensional analysis approach for characterizing pryotechnic mixture systems
[AD-A163018] N86-24863
Holographic investigation of solid propellant combustion in a three-dimensional motor
[AD-A164217] N86-24864

PROPELLANT GRAINS
Convective heating of energetic materials
[AD-A163919] N86-24778

PROPELLANT TRANSFER
Space platform expendables resupply concept definition study
[NASA-CR-178819] N86-24732
Space platform expendables resupply concept definition study. Volume 1: Executive summary
[NASA-CR-178820] N86-24733
Space platform expendables resupply concept definition study, volume 2
[NASA-CR-178821] N86-24734

Space platform expendables resupply concept definition study. Volume 3: Work breakdown structure and work breakdown structure dictionary
[NASA-CR-178822] N86-24735

PROPELLANTS
Measurement of interior ballistic performance using FM/FM radio telemetry techniques
[AD-A164150] N86-24728
Radiation augmented propulsion feasibility
[AD-A163983] N86-24752
CARS (Coherent Anti-Stokes Raman Scattering) spectroscopy of the reaction zone of methane-nitrous oxide and RDX propellant flames
[AD-A163465] N86-24773
Convective heating of energetic materials
[AD-A163919] N86-24778

PROPELLER EFFICIENCY
Evaluation of propfan propulsion applied to general aviation
[NASA-CR-175020] N86-24695
An experimental investigation of reducing advanced turboprop cabin noise by wing shielding
[NASA-TM-87112] N86-25218

PROPELLER FANS
Advanced turboprop vibratory characteristics
[NASA-CR-174708] N86-24693

PROPULSION SYSTEM CONFIGURATIONS
Advanced orbit transfer vehicle propulsion system study
[NASA-CR-174843] N86-24746

PROPULSION SYSTEM PERFORMANCE
Evaluation of propfan propulsion applied to general aviation
[NASA-CR-175020] N86-24695
NASA electrothermal auxiliary propulsion technology
[NASA-TM-87281] N86-24749

PROTECTION
Test results for developing revised LORAN-C protection criteria AD-A164139 DOT-TSC-CG-85-4 DOT-CG-N-1-86 HC A04/MF A01
[AD-A164139] N86-24683
Test results for the 2.5-kVA ground fault protector
[AD-A163501] N86-24912

PROTECTIVE CLOTHING
The effect of cold training and the wearing of gloves on manual performance in the cold: A comparison of pure ability and operational tasks
[AD-A163893] N86-25124
Compendium of protective eyewear
[PB86-135779] N86-25126

PROTECTIVE COATINGS
Diffusion oxygen barrier coating A02/MF A01
[NASA-CASE-LAR-13474-1-SB] N86-24814
Life prediction and constitutive models for engine hot section anisotropic materials program
[NASA-CR-174952] N86-25003

PROTECTORS
Test results for the 2.5-kVA ground fault protector
[AD-A163501] N86-24912

PROTOCOL (COMPUTERS)
Development and implementation of the x.25 protocol for the universal network interface device (UNID) 2. Volume 2
[AD-A164042] N86-25134
Analysis and design of a parameterized protocol converter
[AD-A164171] N86-25137
An adaptive collision resolution protocol for random accessed channels
[AD-A164169] N86-25165

PROTON BEAMS
Volume produced H(-), D(-) ion source for proton accelerator and thermo-nuclear fusion research by sheet plasma (1)
[IPPJ-760] N86-25253

PROTOTYPES
Using Ada in the real-time avionics environment Issues and conclusions
[AD-A163844] N86-25151
Electron microscopy observation of electrotransport
[AD-A164107] N86-25213

PROVING
A proof of Grace's theorem by induction
[AD-A163714] N86-25191

PSYCHOLOGICAL FACTORS
Generalizing over conditions by combining the multitrait multimethod matrix and the representative design of experiments
[AD-A163685] N86-25119

PSYCHOLOGICAL TESTS
Generalizing over conditions by combining the multitrait multimethod matrix and the representative design of experiments
[AD-A163685] N86-25119

PULSE CODE MODULATION
Absolute bounds on set intersection and union sizes from distribution information
[AD-A164025] N86-25199

PULSE COMMUNICATION
Jamming effects on digital communication receivers (timing errors and frequency errors)
[AD-A164199] N86-24900

PULSED LASERS
Non-perturbing beam deflection system and method for high repetition rate temperature measurement of combustion flames
[AD-D012154] N86-24780
An ultraviolet laser shadowgraphy system for the SHIVA-STAR fast capacitor bank
[AD-A163867] N86-24968

PULSED RADIATION
Computer model of a passive synthetic aperture imaging system
[AD-A164144] N86-25158

PULSES
Comparison of background characteristics of an RCS (Radar Cross Section) measurement range using a CW-Nulling technique and a pulse-gating technique
[AD-A163965] N86-24896
A seawater battery monitor with fiber optic remote data acquisition capability
[AD-A164178] N86-25052
High efficiency pulse ultraviolet light source
[AD-D011965] N86-25243

PUMPS
Evaluation of Army engine oils in Hydraulic/Power transmission system components
[AD-A163527] N86-24847

PYLONS
Ground vibration test of an F-16 airplane with modified decoupler pylons
[NASA-TM-87634] N86-24685

PYRENEES MOUNTAINS (EUROPE)
A diagnostic analysis of the Pyrenees lee wave event of 21-23 March 1982 N86-25098

PYRITES
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163537] N86-25272

PYROLYSIS
Determination of initial chemical steps in the gas-phase decomposition of energetic molecules
[AD-A163751] N86-24777
Degree to which natural gas is dissociated during thermal oxidation pyrolysis
[BLL-M-36630-(5828.4)] N86-24804

PYROLYTIC MATERIALS
Convective heating of energetic materials
[AD-A163919] N86-24778

PYROTECHNICS
A dimensional analysis approach for characterizing pyrotechnic mixture systems
[AD-A163018] N86-24863

Q

Q FACTORS
The axial injection TEM orbitron maser
[AD-A164166] N86-24985

QUADRATIC EQUATIONS
LQG/LTR design of a robust flight controller for the STOL F-15
[AD-A164111] N86-24708
Shifting the closed-loop spectrum in the optimal linear quadratic regulator problem for hereditary systems
[NASA-CR-178082] N86-25167
Bias and efficiency of the consistent weighted regression estimators in finite population sampling HC A03/MF A01
[AD-A163601] N86-25203

QUADRUPOLES
Quantum theory of ion motion and laser cooling in a radio frequency quadrupole trap
[AD-A163838] N86-25212

QUALITY CONTROL
Weather satellite costs have increased, problems have occurred in their manufacturing quality control
[PB86-131398] N86-24743
Review and critical analysis: Rolling-element bearings for system life and reliability
[NASA-CR-174710] N86-24991

QUANTITATIVE ANALYSIS
A volumetric method for titrimetric analysis of hydrogen peroxide
[AD-A163582] N86-24774

QUANTUM CHEMISTRY
Competing unimolecular reactions of flame radicals. Part 1: Isomerization and dissociation of the methoxy radical
[AD-A164154] N86-24783
Energy and chemical change
[AD-A164147] N86-25231

QUANTUM COUNTERS
Superconducting quantum devices, summary and conclusions
[DE86-001978] N86-25283

QUANTUM MECHANICS
Chaos in laser-matter interactions N86-24989

QUANTUM THEORY
Maximum likelihood recursion and stochastic approximation in sequential designs
[AD-A163628] N86-25188
Quantum theory of ion motion and laser cooling in a radio frequency quadrupole trap
[AD-A163838] N86-25212

QUARTZ CRYSTALS
Method of making a resonator having a desired frequency from a quartz crystal resonator plate
[AD-D012157] N86-24919

QUENCHING (COOLING)
Mathematical model of temperature conditions of cooling of metal during plastic deformation
[BLLD-5828.4-M-36663] N86-24798
Method to reveal microstructures in single phase alloys
[AD-D012020] N86-24826

QUERY LANGUAGES
The use of controlled redundancy in self-adaptive databases N86-25141
The design and implementation of a relational to network query translator for a distributed database management system
[AD-A164013] N86-25296

R

RADAR
Introduction to the microcomputers for solving radar and electronic warfare problems
[AD-A164143] N86-25135

RADAR ANTENNAS
Kalman filter design for the long range intercept function of the F-4E/G fire control system
[AD-A164205] N86-24926

RADAR CROSS SECTIONS
Design methodology of an automated scattering measurement facility
[AD-A163896] N86-24891
Comparison of background characteristics of an RCS (Radar Cross Section) measurement range using a CW-Nulling technique and a pulse-gating technique
[AD-A163965] N86-24896
Simulation of chaff cloud signature
[AD-A164106] N86-24898
Optimal estimation of target in clutter (CHAFF) from radar
[AD-A164200] N86-24901

RADAR ECHOES
Spectral characteristics of radar echoes from aircraft-dispensed chaff N86-24904

RADAR IMAGERY
Airborne bistatic radar limitations and sample calculations
[AD-A163941] N86-24892

RADAR MEASUREMENT
Satellite cloud and precipitation analysis using a minicomputer
[AD-A163821] N86-25084

RADAR REFLECTORS
Simulation of chaff cloud signature
[AD-A164106] N86-24898

RADAR TARGETS
NCTR using a polarization-agile coherent radar system
[AD-A163528] N86-24882

RADAR TRACKING
Optimal estimation of target in clutter (CHAFF) from radar
[AD-A164200] N86-24901

RADIANCE
Infrared background and target measurement HC A05/MF A01
[AD-A163567] N86-25238

RADIANT FLUX DENSITY
Computer model of a passive synthetic aperture imaging system
[AD-A164144] N86-25158

RADIATION ABSORPTION
Radiation augmented propulsion feasibility
[AD-A163983] N86-24752
Laser thermal propulsion
[AD-A164163] N86-24753
Laser probing and modification of MOCVD and VPE reactor kinetics
[AD-A163860] N86-24981

Comparison of absorption and radiation boundary conditions using a time-domain three-dimensional finite difference electromagnetic computer code
[AD-A163828] N86-25149
Laser interaction in long-scalelength plasmas
[AD-A163604] N86-25262

RADIATION DETECTORS
The development and test of a pulse-counting imaging detector system for solar system studies at ultraviolet and visible wavelengths
[NASA-CR-176671] N86-24965

RADIATION DOSAGE
Evaluating compliance with FCC (Federal Communications Commission) specified guidelines for human exposure to radiofrequency radiation
[PB86-127081] N86-25117

RADIATION MEASURING INSTRUMENTS
Improved detector for the measurement of gamma radiation
[PB86-106945] N86-24974

RADIATION SPECTRA
Studies on radiative collisional and ultraviolet lasers
[AD-A163901] N86-24982

RADICALS
Competing unimolecular reactions of flame radicals. Part 1: Isomerization and dissociation of the methoxy radical
[AD-A164154] N86-24783
Radical fluorescence studies with liquid propellants
[AD-A163472] N86-24857
Molecular outflows and mass loss in pre-main-sequence stars N86-25309

RADIO ANTENNAS
VHF-FM communications antennas for project SINCGARS (UH-1 tail whip and cabin roof bent whip evaluation)
[AD-A163561] N86-24883

RADIO FREQUENCIES
Radio-frequency power delivery system: Procedures for error analysis and self-calibration
[PB86-115680] N86-24929
Evaluating compliance with FCC (Federal Communications Commission) specified guidelines for human exposure to radiofrequency radiation
[PB86-127081] N86-25117
Quantum theory of ion motion and laser cooling in a radio frequency quadrupole trap
[AD-A163838] N86-25212

RADIO FREQUENCY INTERFERENCE
Test results for developing revised LORAN-C protection criteria AD-A164139 DOT-TSC-CG-85-4 DOT-CG-N-1-86 HC A04/MF A01
[AD-A164139] N86-24683
Method and apparatus for measuring distance
[NASA-CASE-MSC-20912-1] N86-24879
Electromagnetic pulse: The fifth factor in the impact of a nuclear explosion
[AD-A163695] N86-24885

RADIO NAVIGATION
Reliability of navigation service provided by the global positioning system
[AD-A163541] N86-24680
Test results for developing revised LORAN-C protection criteria AD-A164139 DOT-TSC-CG-85-4 DOT-CG-N-1-86 HC A04/MF A01
[AD-A164139] N86-24683

RADIO SPECTRA
A polarimetric study of the interstellar medium in Taurus dark clouds N86-25306

RADIO TELEMETRY
Measurement of interior ballistic performance using FM/FM radio telemetry techniques
[AD-A164150] N86-24728

RADIO TRANSMISSION
Reliability of navigation service provided by the global positioning system
[AD-A163541] N86-24680
Satellite voice broadcase system study. Volume 1: Executive summary
[NASA-CR-174904] N86-24878
Electromagnetic pulse: The fifth factor in the impact of a nuclear explosion
[AD-A163695] N86-24885

RADIO TRANSMITTERS
Modification of the ionospheric electron velocity distribution function due to resonant absorption of HF waves
[AD-A163025] N86-25073

RADIO WAVES
Technical evaluation report on the ElectromagneticWave Propagation Panel Symposium on Propagation Effects on Military Systems in the High Latitude Region
[AGARD-AR-218] N86-24903

RADIOACTIVE ISOTOPES
A strategy for adoption of accelerator mass spectrometry by the Earth sciences
[TI85-901777] N86-25031

RADIOACTIVE WASTES
Disposal of high-level radioactive wastes in the unsaturated zone: Technical considerations and response to comments
[TI86-900170] N86-25236

RADIOMETERS
Radiometric calibration procedures using the NBS (National Bureau of Standards) MARBLE electronics package
[PB86-129756] N86-24721
Halogen occultation experiment intergrated test plan
[NASA-TM-87709] N86-24744

RAMAN SPECTRA
CARS (Coherent Anti-Stokes Raman Scattering) spectroscopy of the reaction zone of methane-nitrous oxide and RDX propellant flames
[AD-A163465] N86-24773
Investigation of breadboard temperature profiling system for SSME fuel preburner diagnostics
[NASA-CR-178799] N86-24957

RAMAN SPECTROSCOPY
CARS (Coherent Anti-Stokes Raman Scattering) spectroscopy of the reaction zone of methane-nitrous oxide and RDX propellant flames
[AD-A163465] N86-24773
High resolution coherent anti-Stokes Raman spectroscopy of deuterium gas
[AD-A163946] N86-24779

RANDOM ACCESS MEMORY
An adaptive collision resolution protocol for random accessed channels
[AD-A164169] N86-25165
Application of hierarchical data structures to geographical information systems
[AD-A163674] N86-25293

RANDOM NOISE
On detection of number of signals in presence of white noise
[AD-A164211] N86-24927

RANDOM VARIABLES
Poisson approximation of Bernoulli point processes and their superpositions, via coupling
[AD-A163442] N86-25181
Effects of state recovery on creep buckling under variable loading
[NASA-CR-175094] N86-25310

RAPID QUENCHING (METALLURGY)
Heat treatment of tool joints for drill pipes
[BLLD-5828.4-M-36669] N86-24802
Microstructures of surface-melted alloys
[DE86-002916] N86-24819

RARE EARTH ELEMENTS
Using REM oxides to modify steel
[BLL-M-36639-(5828.4)] N86-24791

RATES (PER TIME)
Real-time flight test PCM data acquisition monitor
[AD-A164035] N86-24897

RATIOS
Characterization of the consistent weighted regression estimators
[AD-A163605] N86-25183

RAY TRACING
Graphical study of electromagnetic wave accessibility in tokamak plasmas near the electron-cyclotron frequency
[INPE-3810-PRE/896] N86-25257

RAYLEIGH SCATTERING
Simulation of chaff cloud signature
[AD-A164106] N86-24898

RDX
CARS (Coherent Anti-Stokes Raman Scattering) spectroscopy of the reaction zone of methane-nitrous oxide and RDX propellant flames
[AD-A163465] N86-24773

REACTION KINETICS
Altitude ignition/lean decel study
[AD-A163052] N86-24781
Competing unimolecular reactions of flame radicals. Part 1: Isomerization and dissociation of the methoxy radical
[AD-A164154] N86-24783
Thermokinetic diagram of embrittlement of maraging steel 03N18K9M5T-VD
[BLLD-5828.4-M-36648] N86-24807
Development of a test method to determine potential peroxide content in turbine fuels
[AD-A163590] N86-24858
Time and state resolved studies of molecular decomposition
[AD-A163881] N86-25227

REACTION TIME
Simulation and performance of brushless dc motor actuators
[AD-A163725] N86-24913
An evaluation of color sets for CRT displays
[AD-A163894] N86-25125

REACTIVITY
Introduction to free atoms and particles
[AD-A163586] N86-25224

REACTOR SAFETY
Static and dynamic tensile tests on wide X 6 CrNi 18 11 steel plates to demonstrate the integrity of the reactor tank for the SNR 300 fast sodium-cooled reactor
[BLL-RISLEY-TR-5280-(9091.9F)] N86-25009

READERS
Braille reading system
[NASA-CASE-LAR-13306-1] N86-25292

READING
Education and computers: An AI (Artificial Intelligence) perspective
[AD-A163618] N86-25170

REAL TIME OPERATION
An engineering approach to the use of expert systems technology in avionics applications
[NASA-TM-88263] N86-24687
A real-time simulation evaluation of an advanced detection, isolation and accommodation algorithm for sensor failures in turbine engines
[NASA-TM-87289] N86-24697
Measurement of interior ballistic performance using FM/FM radio telemetry techniques
[AD-A164150] N86-24728
Real-time flight test PCM data acquisition monitor
[AD-A164035] N86-24897
Microprocessor controller with nonvolatile memory implementation
[AD-A164152] N86-25136
Using Ada in the real-time avionics environment issues and conclusions
[AD-A163844] N86-25151
An application of adaptive learning to malfunction recovery
[NASA-CR-166620] N86-25169
Reasoning in real-time for the pilot associate: An examination of a model based approach to reasoning in real-time for artificial intelligence systems using a distributed architecture
[AD-A163947] N86-25171
Real-time adaptive control of a robotic manipulator using three-dimensional stereoscopic vision feedback N86-25175
Routing of high data rate signals using degenerate four wave mixing in BSO
[AD-A163746] N86-25240

RECEIVERS
Test results for developing revised LORAN-C protection criteria AD-A164139 DOT-TSC-CG-85-4 DOT-CG-N-1-86 HC A04/MF A01
[AD-A164139] N86-24683
Airborne bistatic radar limitations and sample calculations
[AD-A163941] N86-24892
A seawater battery monitor with fiber optic remote data acquisition capability
[AD-A164178] N86-25052
Effects of convergence zone multipath on crosscorrelation
[AD-A163650] N86-25221

RECOGNITION
Content-Addressable Memory manager: Design and evaluation
[AD-A164037] N86-25133

RECOMBINATION REACTIONS
Studies of autoionizing states relevant to dielctronic recombination
[DE86-002908] N86-25264

RECRYSTALLIZATION
Method to reveal microstructures in single phase alloys
[AD-D012020] N86-24826

RECURSIVE FUNCTIONS
Maximum likelihood recursion and stochastic approximation in sequential designs
[AD-A163628] N86-25188
Introduction to kernel density estimation
[AD-A163920] N86-25206

REDUCTION (CHEMISTRY)
Influence of lime additions on silicothermic reduction of titanium
[BLLD-5828.4-M-36638] N86-24803

REDUNDANCY
The use of controlled redundancy in self-adaptive databases N86-25141

REFLECTION
Detection and exploitation of vibration induced optical amplitude modulation
[AD-A164179] N86-25244
REFRACTING TELESCOPES
Remote measurement of the atmospheric isoplanatic angle and determination of refractive turbulence profiles by direct inversion of the scintillation amplitude covariance function with Tikhonov regularization
[AD-A163629] N86-25239
REFRACTION
Reliability of navigation service provided by the global positioning system
[AD-A163541] N86-24680
REFRACTIVITY
Interparticle interference during light scattering by submicroinhomogeneous glass
[NASA-TM-88407] N86-24843
Induced Resonance Electron Cyclotron (IREC) quasi-optical maser
[AD-A164167] N86-24986
REFRACTORY MATERIALS
Convective heating of energetic materials
[AD-A163919] N86-24778
Thin film technology of high-critical-temperature superconducting electronics
[AD-A136053] N86-25278
REFRIGERATORS
Electron microscopy observation of electrotransport
[AD-A164107] N86-25213
REFUELING
Space platform expendables resupply concept definition study. Volume 1: Executive summary
[NASA-CR-178820] N86-24733
Space platform expendables resupply concept definition study, volume 2
[NASA-CR-178821] N86-24734
Space platform expendables resupply concept definition study. Volume 3: Work breakdown structure and work breakdown structure dictionary
[NASA-CR-178822] N86-24735
Automating knowledge acquisition in a flightline robot
[AD-A163829] N86-24997
REGRESSION ANALYSIS
Statistical inferences in cross-lagged panel studies
[AD-A163892] N86-25120
Characterization of the consistent weighted regression estimators
[AD-A163605] N86-25183
Higher order residual analysis for nonlinear time series with autoregressive correlation structures
[AD-A163611] N86-25185
Bias and efficiency of the consistent weighted regression estimators in finite population sampling HC A03/MF A01
[AD-A163601] N86-25203
REGULATIONS
Evaluating compliance with FCC (Federal Communications Commission) specified guidelines for human exposure to radiofrequency radiation
[PB86-127081] N86-25117
Disposal of high-level radioactive wastes in the unsaturated zone: Technical considerations and response to comments
[TI86-900170] N86-25236
REGULATORS
Control of a large space structure using direct output feedback and modal suppression
[AD-A163960] N86-24738
REINFORCEMENT (STRUCTURES)
Nonlinear earthquake analysis of concrete building structures
[AD-A163517] N86-25021
RELATIVITY
The bi-metric absolute differential calculus with applications to general relativity N86-25281
RELAXATION (MECHANICS)
Transport and relaxation processes in supercritical fluids
[DE86-002921] N86-24785
RELAXATION TIME
Vibrational energy transfer at a liquid gallium surface. Activation of unimolecular cyclobutene isomerization
[AD-A163023] N86-25230
RELAY SATELLITES
Satellite voice broadcase system study. Volume 1: Executive summary
[NASA-CR-174904] N86-24878
RELIABILITY
Reliability of navigation service provided by the global positioning system
[AD-A163541] N86-24680
A volumetric method for titrimetric analysis of hydrogen peroxide
[AD-A163582] N86-24774
System life and reliability modeling for helicopter transmissions
[NASA-CR-3967] N86-24990
Verification of a Monte Carlo simulation method to find lower confidence limits for the availability and reliability of maintained systems
[AD-A163832] N86-25005
RADC (Rome Air Development Center) nonelectronic reliability notebook. Revision B
[AD-A163900] N86-25007
RELIABILITY ANALYSIS
An empirical study of flight control software reliability
[NASA-CR-178058] N86-25145
RELIABILITY ENGINEERING
Microenvironmental moisture research
[AD-B157859] N86-25004
REMOTE HANDLING
Space platform expendables resupply concept definition study
[NASA-CR-178819] N86-24732
Space platform expendables resupply concept definition study. Volume 1: Executive summary
[NASA-CR-178820] N86-24733
Space platform expendables resupply concept definition study, volume 2
[NASA-CR-178821] N86-24734
Space platform expendables resupply concept definition study. Volume 3: Work breakdown structure and work breakdown structure dictionary
[NASA-CR-178822] N86-24735
Theoretical three-and four-axis gimbal robot wrists
[NASA-TP-2564] N86-25168
REMOTE MANIPULATOR SYSTEM
The design, fabrication and delivery of a manipulator foot restraint mockup for space telescope development testing
[NASA-CR-178837] N86-25121
REMOTE REGIONS
Design and implementation of a centralized data directory for a distributed database management system
[AD-A163843] N86-25295
REMOTE SENSING
Earth resources: A continuing bibliography with indexes (issue 49)
[NASA-SP-7041(49)] N86-25033
Comprehensive integrated remote sensing for US Department of Energy applications
[DE86-002101] N86-25036
Remote monitoring of processes that shape desert surfaces: The Desert Winds Project
[TI86-900108] N86-25099
Studies related to ocean dynamics. Task 3.2: Aircraft Field Test Program to investigate the ability of remote sensing methods to measure current/wind-wave interactions
[NASA-CR-166349] N86-25100
Management information (Wave Propagation Laboratory, Boulder, Colorado)
[PB86-139524] N86-25106
REMOTE SENSORS
Halogen occultation experiment intergrated test plan
[NASA-TM-87709] N86-24744
Remote sensing of atmospheric winds by utilizing speckle-turbulence interaction and optical heterodyne detection
[AD-A164187] N86-25087
Detection and exploitation of vibration induced optical amplitude modulation
[AD-A164179] N86-25244
REMOVAL
Removal of sulfur and nitrogen containing pollutants from discharge gases
[DE85-017799] N86-25058
REPORT GENERATORS
Ground Software Maintenance Facility (GSMF) user's manual. Appendices NASA-CR-178806 NAS 1.26:178806 Rept-41849-G159-026-App HC A05/MF A01
[NASA-CR-178806] N86-25144
REQUIREMENTS
Circuits and exchange parameters at the C2 interface in the case of sequential input-output of discrete information
[AD-A163688] N86-24884
Design and implementation of a centralized data directory for a distributed database management system
[AD-A163843] N86-25295
RESCUE OPERATIONS
A proposed design for an interim space rescue ferry vehicle
[AD-A164039] N86-24741
RESEARCH
Dynamic moire interferometry in mechanics research
[DE86-004128] N86-25028
RESEARCH AND DEVELOPMENT
Testimony of Fred R. Mynatt, Associate Director for Nuclear and Engineering Technologies, Oak Ridge National Laboratory, before the Subcommittee on Energy Research and Production of the Committee on Science and Technology, US House of Representatives
[DE86-002234] N86-25053
Evaluating R and D and new product development ventures: An overview of assessment methods $12.00/MF A01
[PB86-110806] N86-25289
Trends in industrial R and D activities in the United States, Europe and Japan, 1963-83
[PB86-141371] N86-25290
Science policy study. Volume 7: International cooperation in science
[GPO-52-283] N86-25301
RESEARCH FACILITIES
Halogen occultation experiment intergrated test plan
[NASA-TM-87709] N86-24744
RESEARCH MANAGEMENT
Earth science investigations in the United States Antarctic Research Program (USARP) for the period July 1, 1984 - June 30, 1985
[PB86-143773] N86-25076
Management information (Wave Propagation Laboratory, Boulder, Colorado)
[PB86-139524] N86-25106
Trends in industrial R and D activities in the United States, Europe and Japan, 1963-83
[PB86-141371] N86-25290
European Science Notes, Volume 40, Number 3 ESN-40-3 HC A03/MF A01
[AD-A164182] N86-25298
RESERVOIRS
Fireproof hydraulic brake system
[AD-A163542] N86-24688
RESIDUAL STRESS
Residual-stress induced damage in composite materials
[AD-A164191] N86-24767
RESIN BONDING
Physico-chemical factors affecting hydrothermal resistance and bonding of polymeric composites to steel surfaces
[AD-A163906] N86-24852
RESISTANCE HEATING
A morphological study of waves in the thermosphere using DE-2 observations
[NASA-CR-176775] N86-25070
RESISTOJET ENGINES
Performance and endurance tests of a multipropellant resistojet for space station auxiliary propulsion
[NASA-TM-87278] N86-24748
NASA electrothermal auxiliary propulsion technology
[NASA-TM-87281] N86-24749
RESOLUTION CELL
Optimal estimation of target in clutter (CHAFF) from radar
[AD-A164200] N86-24901
RESONANCE
Designing a 25-kilowatt high frequency series resonant
[NASA-CR-176774] N86-24906
FORTRAN program for vibration and sound radiation of spherical shell
[AD-A163752] N86-25022
RESONANT FREQUENCIES
The determination of the natural frequencies and mode shapes for anisotropic laminated plates including the effects of shear deformation and rotatory inertia
[AD-A164040] N86-24763
Modification of the ionospheric electron velocity distribution function due to resonant absorption of HF waves
[AD-A163025] N86-25073
Quantum theory of ion motion and laser cooling in a radio frequency quadrupole trap
[AD-A163838] N86-25212
RESONATORS
Method of making a resonator having a desired frequency from a quartz crystal resonator plate
[AD-D012157] N86-24919
Reciprocity calibration in a plane wave resonator
[AD-A164149] N86-24972
RESOURCE ALLOCATION
Distributed FIFO allocation of identical resources using small shared space
[AD-A163988] N86-24716
RESOURCES
Distributed FIFO allocation of identical resources using small shared space
[AD-A163988] N86-24716
RESPIRATION
Isotopic study of the inhalation toxicology of oxidants
[PB86-109485] N86-25116

REVERSE FIELD PINCH
Kink stability of long ion layers
[IPPJ-758] N86-25250
REVERSING
Reverse-wave suppressor mirror effects on CW HF unstable ring laser performance
[AD-A163529] N86-24979
REVISIONS
Disposal of high-level radioactive wastes in the unsaturated zone: Technical considerations and response to comments
[TI86-900170] N86-25236
REYNOLDS EQUATION
Contributions to the understanding of large-scale coherent structures in developing free turbulent shear flows
[NASA-CR-176772] N86-24932
REYNOLDS NUMBER
Experimental study of the supersonic turbulent boundary layer on a blunted axisymmetric body
[AD-A163736] N86-24669
Effects of surface roughness on pressure distribution and boundary layer over compressor blades at high Reynolds number in a two-dimensional cascade
[AD-A163974] N86-24946
RICCATI EQUATION
Solutions of nonlinear matrix equations
[AD-A163841] N86-25195
RIGID STRUCTURES
Damping characteristics of metal matrix composites
[AD-A163569] N86-24762
RING LASERS
High resolution coherent anti-Stokes Raman spectroscopy of deuterium gas
[AD-A163946] N86-24779
Reverse-wave suppressor mirror effects on CW HF unstable ring laser performance
[AD-A163529] N86-24979
Optical feedback stabilization of laser diodes for passive resonance ring laser gyro applications
[AD-A163942] N86-24983
Chaos in laser-matter interactions N86-24989
RIO GRANDE (NORTH AMERICA)
National Weather Service (NWS) Southern Region QPF (Quantitative Precipitation Forecasting) Workshop
[PB85-199164] N86-25094
RIPPLES
Lubricant foaming and aeration study, part 2
[AD-A163696] N86-24849
RISK
Technology assessment: Methods for measuring the level of computer security
[PB86-129954] N86-25140
ROBOTICS
Adaptive control, learning, and cost-effective sensor systems for robotics or advanced automation systems
[AD-A163615] N86-24996
Real-time adaptive control of a robotic manipulator using three-dimensional stereoscopic vision feedback
N86-25175
ROBOTS
Gyro and accelerometer based navigation system for a mobile autonomous robot
[AD-A164036] N86-24682
Automating knowledge acquisition in a flightline robot
[AD-A163829] N86-24997
A robot vision system
[AD-A164202] N86-24999
Structural design and kinematic configuration of two-armed robots
[NASA-TM-88419] N86-25000
Theoretical three-and four-axis gimbal robot wrists
[NASA-TP-2564] N86-25168
ROCKET NOZZLES
ACTA Armamentarii (selected articles)
[AD-A163713] N86-24861
ROCKET OXIDIZERS
Calculated research on the energetic characteristic of TN in composite solid propellant
[AD-A163691] N86-24859
ROCKET PROPELLANTS
Performance and endurance tests of a multipropellant resistojet for space station auxiliary propulsion
[NASA-TM-87278] N86-24748
Radiation augmented propulsion feasibility
[AD-A163983] N86-24752
ROCKS
Chemical, petrographic and K-Ar age data to accompany reconnaissance geologic strip map from Kingman to South of Bill Williams Mountain, Arizona
[DE85-014242] N86-25035
ROLL FORMING
Determination of main strength properties of 9KhF roll steel
[BLL-M-36651-(5828.4)] N86-25014
ROLLER BEARINGS
Review and critical analysis: Rolling-element bearings for system life and reliability
[NASA-CR-174710] N86-24991
ROTARY STABILITY
The effect of energy dissipation due to friction at the joint of a simple beam structure
[AD-A163975] N86-24739
ROTARY WING AIRCRAFT
Swashplate control system
[NASA-CASE-ARC-11633-1] N86-24700
ROTARY WINGS
Helicopter rotor noise due to ingestion of atmospheric turbulence
[NASA-CR-3973] N86-25216
Cost estimating relationships for fixed wing aircraft: List price versus empty weight
[AD-A164196] N86-25300
ROTOR AERODYNAMICS
Rotor performance characteristics from an aeroacoustic helicopter wind-tunnel test program
[NASA-TM-87661] N86-24665
Passive eddy-current damping as a means of vibration control in cryogenic turbomachinery
[NASA-TP-2562] N86-24722
ROTOR BLADES (TURBOMACHINERY)
Rotor performance characteristics from an aeroacoustic helicopter wind-tunnel test program
[NASA-TM-87661] N86-24665
Data analysis on the rotor test stand program for interactive processing
[NASA-TM-77948] N86-25146
ROTORS
One-piece HPTR blade squealer tip
[AD-D012003] N86-24698
Swashplate control system
[NASA-CASE-ARC-11633-1] N86-24700
Unsteady heat transfer and direct comparison to steady-state measurements in a rotor-wake experiment
[NASA-TM-87220] N86-24934
RUNWAYS
Computed centerline MLS (Microwave Landing System) approach demonstration at Washington National Airport
[AD-A163722] N86-24681
Fireproof hydraulic brake system
[AD-A163542] N86-24688
RYDBERG SERIES
Journal of Research of the National Bureau of Standards, volume 90, number 4, July-August 1985
[PB86-137627] N86-24786
Studies of autoionizing states relevant to dielctronic recombination
[DE86-002908] N86-25264

S

S WAVES
Radio-frequency power delivery system: Procedures for error analysis and self-calibration
[PB86-115680] N86-24929
SABOT PROJECTILES
Hall station and camera system operation and maintenance manual
[NASA-CR-178836] N86-24966
SAFETY DEVICES
Compendium of protective eyewear
[PB86-135779] N86-25126
SALINITY
Physical oceanographic data marginal ice zone experiment R/V POLAR QUEEN, June-July 1984
[AD-A163591] N86-25101
SAMPLES
Apparatus for electrical measurements of thin films from 77 to 1000 K
[NASA-TM-87256] N86-24959
SAMPLING
Verification of a Monte Carlo simulation method to find lower confidence limits for the availability and reliability of maintained systems
[AD-A163832] N86-25005
Stratospheric tritium sampling
[DE86-004368] N86-25059
Bias and efficiency of the consistent weighted regression estimators in finite population sampling HC A03/MF A01
[AD-A163601] N86-25203
Introduction to kernel density estimation
[AD-A163920] N86-25206
SATELLITE CONTROL
The detumbling of an axially symmetric satellite with an orbital maneuvering vehicle by nonlinear feedback control
[AD-A163989] N86-24717
SATELLITE NAVIGATION SYSTEMS
Reliability of navigation service provided by the global positioning system
[AD-A163541] N86-24680
SATELLITE NETWORKS
Satellite voice broadcast system study, volume 2
[NASA-CR-174905] N86-24877
Impact of the 1985 Space World Administrative Radio Conference on frequency/orbit planning and use
[NASA-TM-87285] N86-24881
DSCS network performance software support. Revision
[AD-A163530] N86-25163
SATELLITE OBSERVATION
Earth resources: A continuing bibliography with indexes (issue 49)
[NASA-SP-7041(49)] N86-25033
The analysis of near-Earth satellite astrometric data at the ETS
[AD-A163902] N86-25312
SATELLITE ORBITS
A semi-analytic theory for satellite orbit prediction
N86-24718
Nickel hydrogen battery cell testing data base: An industry and government survey
[AD-A163017] N86-25051
State estimation procedure based upon the duality concept
[INPE-3786-PRE/891] N86-25179
Kalman filtering state noise adaptive estimation
[INPE-3790-PRE/885] N86-25202
SATELLITE TRANSMISSION
Satellite voice broadcase system study. Volume 1: Executive summary
[NASA-CR-174904] N86-24878
SCALE (CORROSION)
Influence of oxidation on coefficient of hydrogen diffusion in meraging steels
[BLL-M-36647-(5828.4)] N86-24808
Transverse microsections of thin oxide scales for AEM studies
[AERE-R-11266] N86-24833
SCALE MODELS
NCTR using a polarization-agile coherent radar system
[AD-A163528] N86-24882
SCANNERS
Electron microscopy observation of electrotransport
[AD-A164107] N86-25213
SCANNING
Effectiveness of laser treatment of materials by scanning beam
[BLL-M-36690-(5828.4)] N86-24793
SCATTERING
Design methodology of an automated scattering measurement facility
[AD-A163896] N86-24891
Energy and chemical change
[AD-A164147] N86-25231
SCATTERING CROSS SECTIONS
Studies related to ocean dynamics. Task 3.2: Aircraft Field Test Program to investigate the ability of remote sensing methods to measure current/wind-wave interactions
[NASA-CR-168349] N86-25100
SCHLIEREN PHOTOGRAPHY
Optical studies of electrical discharge-liquid propellant interactions
[AD-A164156] N86-24784
An experimental study of clustered nozzles with variable shrouds
[AD-A163961] N86-24945
A schlieren and hot-wire investigation of karman vortex streets
[AD-A164101] N86-24949
SCHOTTKY DIODES
Study and analysis of AlGaAs/GaA modulation doped field-effect transistors incorporating p-type Schottky gate barriers
[AD-A164103] N86-24922
Schottky barrier surface science
[AD-A163574] N86-25275
SCINTILLATION
Remote measurement of the atmospheric isoplanatic angle and determination of refractive turbulence profiles by direct inversion of the scintillation amplitude covariance function with Tikhonov regularization
[AD-A163629] N86-25239
SEA LEVEL
Monthly maps of sea level anomalies in the Pacific, 1975 1981. Report on the IGOSS (Integrated Global Ocean Services System) Sea Level Pilot Project
[AD-A163061] N86-25104
SEA WATER
Effects of seawater and deionized water at 0 to 80 deg C on the flexural properties of a glass/epoxy composite
[NASA-TM-86544] N86-24758

A seawater battery monitor with fiber optic remote data acquisition capability
[AD-A164178] N86-25052
SEALS (STOPPERS)
Experimental assessment of advanced Stirling component concepts
[NASA-CR-174994] N86-25302
SEARCHING
Content-Addressable Memory manager: Design and evaluation
[AD-A164037] N86-25133
SEASONS
Monthly and seasonal weather outlook for mid-January to mid-February 1986, volume 40, number 2, January 14, 1986
[PB86-145828] N86-25093
SEATS
A review of the pilot backache problem in the CH113 Labrador helicopter
[AD-A164011] N86-25113
SECONDARY FLOW
Experimental investigation of turbulent heat transfer in straight and curved rectangular ducts
[AD-A164142] N86-24950
SECONDARY INJECTION
Two-dimensional confined jet thrust vector control with flow visualization and variable flow geometry
[AD-A164214] N86-24699
SEDIMENTS
Controlling nonpoint pollution in Virginia's urbanizing areas: An institutional perspective
[AD-A163693] N86-25057
SELF ADAPTIVE CONTROL SYSTEMS
The use of controlled redundancy in self-adaptive databases N86-25141
SEMICONDUCTING FILMS
Non-linear optical techniques for visible and UV lasers and thin film deposition
[AD-A164188] N86-24828
SEMICONDUCTOR DEVICES
Analysis of optically controlled microwave/millimeter wave device structures
[NASA-TM-87246] N86-24907
Silicon production in a fluidized bed reactor
[JPL-PUBL-86-17] N86-25043
Connecting mathematics, science and high technology: Research on solutions to nonlinear partial differential equations, bifurcation phenomena, and constructive methods for implementing the calculus of variations for relevant, physical problems
[AD-A162827] N86-25197
Auger electron spectroscopy, secondary ion mass spectroscopy and optical characterization of a-C-H and BN films
[NASA-TM-87258] N86-25268
Theoretical investigation of point defects of mercury cadmium telluride A01
[AD-A163735] N86-25277
SEMICONDUCTOR DIODES
Optical feedback stabilization of laser diodes for passive resonance ring laser gyro applications
[AD-A163942] N86-24983
Technology for satellite power conversion
[NASA-CR-176777] N86-25042
SEMICONDUCTOR JUNCTIONS
Method of measuring field funneling and range straggling in semiconductor charge-collecting junctions
[NASA-CASE-NPO-16584-1-CU] N86-25269
SEMICONDUCTOR LASERS
Optical feedback stabilization of laser diodes for passive resonance ring laser gyro applications
[AD-A163942] N86-24983
SEMICONDUCTORS (MATERIALS)
Electromagnetic pulse: The fifth factor in the impact of a nuclear explosion
[AD-A163695] N86-24885
Floating emitter solar cell junction transistor
[NASA-CASE-NPO-16467-1-CU] N86-24908
Flat plate and turbine vane cascade heat transfer investigation using a shock tube
[AD-A163992] N86-24947
Overlayer-induced enhanced oxidation of GaAs surfaces
[AD-A163450] N86-25270
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163559] N86-25273
A characterization of the chemical vapor deposition of gallium arsenide and indium phosphide in the hydride and chloride systems
[AD-A164259] N86-25279
SEPARATED FLOW
A numerical analysis applied to high angle of attack three-dimensional inlets
[NASA-TM-87296] N86-24658
ALESEP. Part 2: A computer program for the analysis of leading edge separation bubbles on infinite swept wings
[NASA-CR-178015] N86-24664
Experimental study of the supersonic turbulent boundary layer on a blunted axisymmetric body
[AD-A163736] N86-24669
The development of vorticity and vortices from forced unsteady flow separation N86-24671
A computational study of multiple jet and wall interaction
[NASA-TM-86541] N86-24937
Separated flows
[AD-A163551] N86-24939
Structure and mixing in turbulent shear flows
[AD-A163584] N86-24940
Effects of surface roughness on pressure distribution and boundary layer over compressor blades at high Reynolds number in a two-dimensional cascade
[AD-A163974] N86-24946
Numerical flow field calculations for a missile configuration at M = .6
[AD-A164155] N86-24951
Technical notes on orifice tests
[AD-A164227] N86-24952
SEPARATORS
Fireproof hydraulic brake system
[AD-A163542] N86-24688
SEQUENCING
The structures of discourse structure
[AD-A163024] N86-25172
SEQUENTIAL ANALYSIS
Maximum likelihood recursion and stochastic approximation in sequential designs
[AD-A163628] N86-25188
SERVICE LIFE
Renewing solar science: The solar maximum repair mission
[NASA-EP-206] N86-24714
Failure times in maintenance models
[AD-A163891] N86-25006
Long life nickel electrodes for a nickel-hydrogen cell: Cycle life tests
[NASA-CR-174815] N86-25046
SERVICE MODULES
Space platform expendables resupply concept definition study
[NASA-CR-178819] N86-24732
Space platform expendables resupply concept definition study. Volume 1: Executive summary
[NASA-CR-178820] N86-24733
Space platform expendables resupply concept definition study, volume 2
[NASA-CR-178821] N86-24734
Space platform expendables resupply concept definition study. Volume 3: Work breakdown structure and work breakdown structure dictionary
[NASA-CR-178822] N86-24735
SETUPS
Laser-photodetector timing station instruction and maintenance manual
[NASA-CR-178835] N86-24720
SEWERS
Centerville Beach. Project completion report
[AD-A163461] N86-25056
SHADOWGRAPH PHOTOGRAPHY
Optical studies of electrical discharge-liquid propellant interactions
[AD-A164156] N86-24784
An ultraviolet laser shadowgraphy system for the SHIVA-STAR fast capacitor bank
[AD-A163867] N86-24968
SHAFTS (MACHINE ELEMENTS)
Gyro and accelerometer based navigation system for a mobile autonomous robot
[AD-A164036] N86-24682
Experimental assessment of advanced Stirling component concepts
[NASA-CR-174994] N86-25302
SHAPES
A study of a collision avoidance system mounted on a curved ground plane
[NASA-CR-176771] N86-24677
Robust estimation of the location parameter of life distributions
[AD-A163993] N86-25008
SHEAR FLOW
Contributions to the understanding of large-scale coherent structures in developing free turbulent shear flows
[NASA-CR-176772] N86-24932
Structure and mixing in turbulent shear flows
[AD-A163584] N86-24940
Theoretical studies of magnetized plasma turbulence: Ion-cyclotron turbulence, and shear flow turbulence and its applications to tokamak edge phenomena N86-25265
SHEAR PROPERTIES
Analysis of the stress state in an Iosipescu sheartest specimen
[NASA-CR-176745] N86-24755
The determination of the natural frequencies and mode shapes for anisotropic laminated plates including the effects of shear deformation and rotatory inertia
[AD-A164040] N86-24763
Structure and mixing in turbulent shear flows
[AD-A163584] N86-24940
SHEAR STRESS
Simplified composite micromechanics for predicting microstresses
[NASA-TM-87295] N86-24759
Crack healing in polymers
[AD-A164130] N86-24856
Studies of vertical annular gas-liquid flows N86-24956
SHELLS (STRUCTURAL FORMS)
FORTRAN program for vibration and sound radiation of spherical shell
[AD-A163752] N86-25022
SHIELDING
An experimental investigation of reducing advanced turboprop cabin noise by wing shielding
[NASA-TM-87112] N86-25218
Jet shielding of jet noise
[NASA-CR-3966] N86-25219
SHIPS
Relative positioning of ocean bottom benchmarks AD-A164177 HC A05/MF A01
[AD-A164177] N86-24684
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 1. Sections 1 to 8
[AD-A163670] N86-24822
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 2: Appendices A3, A4, A6, A8
[AD-A163671] N86-24823
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 3: Appendix A7
[AD-A163672] N86-24824
SHOCK TUBES
Flat plate and turbine vane cascade heat transfer investigation using a shock tube
[AD-A163992] N86-24947
SHOCK WAVES
Experimental study of the supersonic turbulent boundary layer on a blunted axisymmetric body
[AD-A163736] N86-24669
SHOPS
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 1. Sections 1 to 8
[AD-A163670] N86-24822
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 2: Appendices A3, A4, A6, A8
[AD-A163671] N86-24823
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 3: Appendix A7
[AD-A163672] N86-24824
SHORELINES
Centerville Beach. Project completion report
[AD-A163461] N86-25056
SHORT TAKEOFF AIRCRAFT
In-flight measurements of wing ice shapes and wing section drag increases caused by natural icing conditions
[NASA-TM-87301] N86-24667
Experimental study of apex fences for lift enhancement on a highly swept delta wing configuration
[AD-A163877] N86-24705
Multivariable control law design for enhanced air combat maneuvering. F-15/STOL (Short Take-Off and Landing) derivative fighter
[AD-A164017] N86-24706
An LQG up-and away flight control design for the STOL F-15 aircraft
[AD-A164108] N86-24707
LQG/LTR design of a robust flight controller for the STOL F-15
[AD-A164111] N86-24708

SHROUDS
An experimental study of clustered nozzles with variable shrouds
[AD-A163961] N86-24945
SIGNAL ANALYZERS
A transducer for bottom-scattering measurements
[AD-A163967] N86-25222
SIGNAL DETECTION
Detection and location of ballistic damage in composite materials using acoustic emission methods
[AD-A164183] N86-24766
SIGNAL DISTORTION
Time domain algorithms
[AD-A163054] N86-24895
SIGNAL ENCODING
Real-time flight test PCM data acquisition monitor
[AD-A164035] N86-24897
Absolute bounds on set intersection and union sizes from distribution information
[AD-A164025] N86-25199
SIGNAL MIXING
Routing of high data rate signals using degenerate four wave mixing in BSO
[AD-A163746] N86-25240
SIGNAL PROCESSING
Detection and location of ballistic damage in composite materials using acoustic emission methods
[AD-A164183] N86-24766
Characteristics of Bayesian multiple model adaptive estimation for tracking airborne targets
[AD-A163830] N86-24890
Time domain algorithms
[AD-A163054] N86-24895
Optimal estimation of target in clutter (CHAFF) from radar
[AD-A164200] N86-24901
Data analysis on the rotor test stand program for interactive processing
[NASA-TM-77948] N86-25146
Optical star coupler with large number of inputs and outputs
[NASA-TM-88395] N86-25237
SIGNAL TO NOISE RATIOS
Airborne bistatic radar limitations and sample calculations
[AD-A163941] N86-24892
Architecture and numerical accuracy of high-speed DFT (Discrete Fourier Transform) processing systems
[AD-A163963] N86-25132
SIGNATURES
Simulation of chaff cloud signature
[AD-A164106] N86-24898
SIGNS AND SYMPTOMS
A review of the pilot backache problem in the CH113 Labrador helicopter
[AD-A164011] N86-25113
SILICATES
Conductimetric determination of decomposition of silicate melts
[NASA-TM-88394] N86-24769
SILICON
Journal of Research of the National Bureau of Standards, volume 90, number 4, July-August 1985
[PB86-137627] N86-24786
Silicon distribution in synthetic cast iron
[BLL-M-36689-(5828.4)] N86-24792
Influence of lime additions on silicothermic reduction of titanium
[BLLD-5828.4-M-36638] N86-24803
Diffusion oxygen barrier coating A02/MF A01
[NASA-CASE-LAR-13474-1-SB] N86-24814
Technology for satellite power conversion
[NASA-CR-176777] N86-25042
Silicon production in a fluidized bed reactor
[JPL-PUBL-86-17] N86-25043
A characterization of the chemical vapor deposition of gallium arsenide and indium phosphide in the hydride and chloride systems
[AD-A164259] N86-25279
SILICON CARBIDES
Improved consolidation of silicon carbide
[NASA-TM-87243] N86-24836
Compensation in epitaxial cubic SiC films
[NASA-TM-87269] N86-25267
SILICON COMPOUNDS
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163537] N86-25272
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163559] N86-25273
SILICON DIOXIDE
A model for oxygen atom recombination on a silicon dioxide surface
[AD-A163990] N86-24782
Hot gas corrosion of silicon based ceramics
[AD-A163810] N86-24850
SILICON NITRIDES
Particle size reduction of Si3N4 with Si3N4 milling hardware
[NASA-TM-86864-REV] N86-24839
SILICON OXIDES
Is G305.8-0.2 a young object?
[INPE-3787-PRE/682] N86-25304
SILICONES
Adhesion and the surface behavior of the silicone elastomer
[AD-A163815] N86-24851
SIMULATION
Properties of 14Kh17N2 steel in corrosive environment
[BLL-M-36691-(5828.4)] N86-24794
Simulation and performance of brushless dc motor actuators
[AD-A163725] N86-24913
Microenvironmental moisture research
[AD-B157859] N86-25004
Verification of a Monte Carlo simulation method to find lower confidence limits for the availability and reliability of maintained systems
[AD-A163832] N86-25005
Monte Carlo simulation of two-particle relative diffusion using Eulerian statistics: Extended abstract
[PB86-116548] N86-25077
SINGLE CRYSTALS
Anisotropy of high temperature strength in precipitation-hardened nickel-base superalloy single crystals
[NASA-TM-88387] N86-24815
Abrasion and deformed layer formation of manganese-zinc ferrite in sliding contact with lapping tapes
[NASA-TM-87249] N86-24838
Life prediction and constitutive models for engine hot section anisotropic materials program
[NASA-CR-174952] N86-25003
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163537] N86-25272
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163559] N86-25273
The photoelectrochemical properties of MoS sub2 single crystals grown in the presence of cobalt
[AD-A163592] N86-25276
SINGULARITY (MATHEMATICS)
Three dimensional finite element analysis of failure in composite laminates N86-24768
SINTERING
Improved consolidation of silicon carbide
[NASA-TM-87243] N86-24836
Manufacture of ceramic sinters
[NASA-TM-88398] N86-24842
SITES
Computed centerline MLS (Microwave Landing System) approach demonstration at Washington National Airport
[AD-A163722] N86-24681
SKIN (ANATOMY)
Unsteady solution of the boundary layer equations with application to space shuttle tiles
[AD-A164105] N86-24727
SKIN FRICTION
Experimental study of the supersonic turbulent boundary layer on a blunted axisymmetric body
[AD-A163736] N86-24669
SLAGS
Influence of lime additions on silicothermic reduction of titanium
[BLLD-5828.4-M-36638] N86-24803
SLENDER BODIES
Investigation of rolling-up and interaction of leading-edge and trailing-edge vortex sheets on a slender delta wing
[AD-A163692] N86-24668
SMELTING
Silicon distribution in synthetic cast iron
[BLL-M-36689-(5828.4)] N86-24792
SMOKE
Data sources for parameters used in predictive modeling of fire growth and smoke spread
[PB86-130986] N86-24788
Remote sensing of atmospheric winds by utilizing speckle-turbulence interaction and optical heterodyne detection
[AD-A164187] N86-25087
SOCIAL FACTORS
Leadership on the flight deck: The influence of crew social relations and crew member experience on leadership style effectiveness in civil aviation flight crews
[CAR-8612] N86-25286
SOFTWARE ENGINEERING
A data base and analysis program for shuttle main engine dynamic pressure measurements
[NASA-CR-178808] N86-24750
Ground Software Maintenance Facility (GSMF) system manual
[NASA-CR-178804] N86-25143
Ground Software Maintenance Facility (GSMF) user's manual. Appendices NASA-CR-178806 NAS 1.26:178806 Rept-41849-G159-026-App HC A05/MF A01
[NASA-CR-178806] N86-25144
An empirical study of flight control software reliability
[NASA-CR-178058] N86-25145
SOFTWARE TOOLS
Image segmentation using the military specification 1750A
[AD-A164180] N86-25138
Ground Software Maintenance Facility (GSMF) system manual
[NASA-CR-178804] N86-25143
SOIL MECHANICS
Improved numerical implementation of the bounding surface plasticity model for cohesive soils
[AD-A163572] N86-24870
SOIL SCIENCE
Improved numerical implementation of the bounding surface plasticity model for cohesive soils
[AD-A163572] N86-24870
SOILS
Improved numerical implementation of the bounding surface plasticity model for cohesive soils
[AD-A163572] N86-24870
SOLAR ACTIVITY
Renewing solar science: The solar maximum repair mission
[NASA-EP-206] N86-24714
SOLAR ACTIVITY EFFECTS
Omega long-term phase advances
[PB85-233211] N86-24902
SOLAR ARRAYS
Silicon production in a fluidized bed reactor
[JPL-PUBL-86-17] N86-25043
Environmental tests of metallization systems for terrestrial photovoltaic cells
[JPL-PUBL-85-86] N86-25045
SOLAR CELLS
Floating emitter solar cell junction transistor
[NASA-CASE-NPO-16467-1-CU] N86-24908
Overview of software development at the parabolic dish test site
[JPL-PUBL-85-56] N86-25044
VMJ solar cell fabrication process using mask aligner
[AD-D011966] N86-25050
SOLAR COSMIC RAYS
Omega long-term phase advances
[PB85-233211] N86-24902
SOLAR ENERGY CONVERSION
Silicon production in a fluidized bed reactor
[JPL-PUBL-86-17] N86-25043
Overview of software development at the parabolic dish test site
[JPL-PUBL-85-56] N86-25044
Energy transfer and photochemistry in biomimetic solar conversion
[PB86-142114] N86-25054
SOLAR FLARES
The possible importance of synchrotron/inverse Compton losses to explain fast MM-wave and hard X-ray emission of a solar event
[NASA-TM-88659] N86-25316
SOLAR GENERATORS
Radiation augmented propulsion feasibility
[AD-A163983] N86-24752
SOLAR HEATING
Vapor phase heat transport systems
[DE86-004360] N86-24954
SOLAR MAXIMUM MISSION
Renewing solar science: The solar maximum repair mission
[NASA-EP-206] N86-24714
SOLAR RADIATION
Radiation augmented propulsion feasibility
[AD-A163983] N86-24752
Empirical and modeled synoptic cloud climatology of the Arctic Ocean
[NASA-CR-176752] N86-25078
The possible importance of synchrotron/inverse Compton losses to explain fast MM-wave and hard X-ray emission of a solar event
[NASA-TM-88659] N86-25316
SOLAR SYSTEM
Motion in the restricted problem of three bodies for small values of the mass parameter N86-25201

SOLAR WIND
A plasma wave instrument on the AMPTE/IRM (Active Magnetospheric Particle Tracing Explorers/Ion Release Module) spacecraft
[AD-A163048] N86-25074
SOLID PROPELLANT COMBUSTION
Holographic investigation of solid propellant combustion in a three-dimensional motor
[AD-A164217] N86-24864
SOLID PROPELLANT ROCKET ENGINES
Non-destructive laser holographic testing of solid propellant for unbonding defects
[AD-A163694] N86-24860
SOLID PROPELLANTS
Calculated research on the energetic characteristic of TN in composite solid propellant
[AD-A163691] N86-24859
SOLID ROCKET PROPELLANTS
Feasibility study and verified design concept for new improved hot gas facility
[NASA-CR-178828] N86-24719
Calculated research on the energetic characteristic of TN in composite solid propellant
[AD-A163691] N86-24859
Non-destructive laser holographic testing of solid propellant for unbonding defects
[AD-A163694] N86-24860
Holographic investigation of solid propellant combustion in a three-dimensional motor
[AD-A164217] N86-24864
SOLID SOLUTIONS
Melting of solid solution during crystallization of alloy white cast iron
[BLL-M-36677-(5828.4)] N86-24796
Accurate sturcture factor determination of binary cubic solid solutions
[DE86-002891] N86-24832
SOLIDIFICATION
Microstructures of surface-melted alloys
[DE86-002916] N86-24819
SOLITARY WAVES
A solidary wave of a relativistic magnetosonic wave propagating perpendicularly to a magnetic field
[IPPJ-767] N86-25260
SOLUTIONS
Stationary motions and incompressible limit for compressible viscous fluids
[AD-A163600] N86-24941
L(2) stability for weak solutions of the Navier-Stokes equations in R(3)
[AD-A163612] N86-24942
A database for compounding stress intensity factors
[AD-A163779] N86-25023
Remarks on the existence and uniqueness of unbounded viscosity solutions of Hamilton-Jacobi equations
[AD-A163701] N86-25189
SOLVENTS
Low-solvent primer and finish coats for use on steel structures
[PB86-139326] N86-24834
Protected ethynlated phenols
[AD-D012019] N86-24854
SONAR
Effects of convergence zone multipath on crosscorrelation
[AD-A163650] N86-25221
SOOT
Mechanisms of combustion of hydrocarbon/alcohol fuel blends
[AD-A163737] N86-24776
SOUND FIELDS
The behavior of cloud droplets in an acoustic field: A numerical investigation
[AD-A163704] N86-25081
SOUND TRANSDUCERS
A transducer for bottom-scattering measurements
[AD-A163987] N86-25222
SOUND TRANSMISSION
FORTRAN program for vibration and sound radiation of spherical shell
[AD-A163752] N86-25022
SOUND WAVES
Non-perturbing beam deflection system and method for high repetition rate temperature measurement of combustion flames
[AD-D012154] N86-24780
FORTRAN program for vibration and sound radiation of spherical shell
[AD-A163752] N86-25022
The behavior of cloud droplets in an acoustic field: A numerical investigation
[AD-A163704] N86-25081
Detection and exploitation of vibration induced optical amplitude modulation
[AD-A164179] N86-25244
SOUTHERN HEMISPHERE
Gamma-ray background induced in a double Ge(Li) spectrometer at balloon altitudes in the hemisphere
[INPE-3797-PRE/892] N86-25317
SPACE COMMERCIALIZATION
Research and competition: Best partners
[NASA-TM-87313] N86-25321
SPACE ERECTABLE STRUCTURES
Space Station Systems: A bibliography with indexes (supplement 1)
[NASA-SP-7056(01)] N86-24711
SPACE EXPLORATION
The great observatories for space astrophysics
[NASA-CR-176754] N86-24712
Overview of space technology
[AD-A163887] N86-24715
Research and technology, fiscal year 1985
[NASA-TM-88753] N86-25320
SPACE FLIGHT
Overview of space technology
[AD-A163887] N86-24715
SPACE FLIGHT TRAINING
USSR Space Life Sciences Digest, issue 5
[NASA-CR-3922(05)] N86-25109
SPACE HEATING (BUILDINGS)
Vapor phase heat transport systems
[DE86-004360] N86-24954
SPACE MAINTENANCE
The design, fabrication and delivery of a manipulator foot restraint mockup for space telescope development testing
[NASA-CR-178837] N86-25121
SPACE MISSIONS
Behavioral considerations for space station design
[AD-A163478] N86-25118
An analysis of the accessibility of Earth-approaching asteroids
[AD-A163976] N86-25313
SPACE PLATFORMS
Space platform expendables resupply concept definition study
[NASA-CR-178819] N86-24732
Testimony of Fred R. Mynatt, Associate Director for Nuclear and Engineering Technologies, Oak Ridge National Laboratory, before the Subcommittee on Energy Research and Production of the Committee on Science and Technology, US House of Representatives
[DE86-002234] N86-25053
A definition study of an Advanced Data Collection and Location System (ADCLS)
[NASA-CR-177867] N86-25291
SPACE POWER REACTORS
Testimony of Fred R. Mynatt, Associate Director for Nuclear and Engineering Technologies, Oak Ridge National Laboratory, before the Subcommittee on Energy Research and Production of the Committee on Science and Technology, US House of Representatives
[DE86-002234] N86-25053
SPACE SHUTTLE MAIN ENGINE
A data base and analysis program for shuttle main engine dynamic pressure measurements
[NASA-CR-178808] N86-24750
A computational study of multiple jet and wall interaction
[NASA-TM-86541] N86-24937
Investigation of breadboard temperature profiling system for SSME fuel preburner diagnostics
[NASA-CR-178799] N86-24957
SPACE SHUTTLE MISSION 51-L
Report of the Presidential Commission on the Space Shuttle Challenger Accident, volume 1 N86-24726
SPACE SHUTTLE MISSION 61-B
Selections from Flug Revue und Flugwelt International. A. On the border of Time-hypersonic flight. B. NASA programs pave the way for the hypersonic aircraft. C. Shuttle flight 61-B; construction in space. D. Faster than a bullet; hypersonic military aircraft
[NASA-TM-88418] N86-24652
SPACE SHUTTLE ORBITERS
Space Shuttle flying qualities criteria assessment. Phase 5: Data acquistion and analysis
[NASA-CR-166618] N86-24704
SPACE SHUTTLE PAYLOADS
Shuttle-launch triangular space station
[NASA-CASE-10676-1] N86-24729
SPACE SHUTTLES
Renewing solar science: The solar maximum repair mission
[NASA-EP-206] N86-24714
Unsteady solution of the boundary layer equations with application to space shuttle tiles
[AD-A164105] N86-24727
A model for oxygen atom recombination on a silicon dioxide surface
[AD-A163990] N86-24782
SPACE STATIONS
Structural performance of space station trusses with missing members
[NASA-TM-87715] N86-24731
A computer modeling methodology and tool for assessing design concepts for the Space Station Data Management System
[NASA-TM-87647] N86-24737
Space station 20-kHz power management and distribution system
[NASA-TM-87314] N86-24747
Performance and endurance tests of a multipropellant resistojet for space station auxiliary propulsion
[NASA-TM-87278] N86-24748
NASA electrothermal auxiliary propulsion technology
[NASA-TM-87281] N86-24749
Behavioral considerations for space station design
[AD-A163478] N86-25118
SPACEBORNE EXPERIMENTS
Research in particles and fields
[NASA-CR-176763] N86-25017
SPACECRAFT CABINS
Spacecraft architecture
[NASA-TM-77908] N86-24736
SPACECRAFT COMMUNICATION
Measurement apparation and procedure for the determination of surface emissivities
[NASA-CASE-LAR-13455-1] N86-24880
SPACECRAFT CONTROL
Moving-bank multiple model adaptive algorithms applied to flexible spacecraft control
[AD-A164016] N86-24740
SPACECRAFT DESIGN
Spacecraft architecture
[NASA-TM-77908] N86-24736
Advanced orbit transfer vehicle propulsion system study
[NASA-CR-174843] N86-24746
SPACECRAFT EQUIPMENT
Evaluation of a double Gimbal IPACS design
[NASA-CR-178040] N86-24745
SPACECRAFT INSTRUMENTS
Halogen occultation experiment intergrated test plan
[NASA-TM-87709] N86-24744
A plasma wave instrument on the AMPTE/IRM (Active Magnetospheric Particle Tracing Explorers/Ion Release Module) spacecraft
[AD-A163048] N86-25074
SPACECRAFT MAINTENANCE
Space platform expendables resupply concept definition study. Volume 1: Executive summary
[NASA-CR-178820] N86-24733
Space platform expendables resupply concept definition study, volume 2
[NASA-CR-178821] N86-24734
Space platform expendables resupply concept definition study. Volume 3: Work breakdown structure and work breakdown structure dictionary
[NASA-CR-178822] N86-24735
SPACECRAFT MANEUVERS
A proposed design for an interim space rescue ferry vehicle
[AD-A164039] N86-24741
SPACECRAFT MODELS
Control of a large space structure using direct output feedback and modal suppression
[AD-A163960] N86-24738
Moving-bank multiple model adaptive algorithms applied to flexible spacecraft control
[AD-A164016] N86-24740
SPACECRAFT ORBITS
The detumbling of an axially symmetric satellite with an orbital maneuvering vehicle by nonlinear feedback control
[AD-A163989] N86-24717
SPACECRAFT POWER SUPPLIES
Principles for system level electrochemistry
[NASA-TM-87283] N86-25039
Technology for satellite power conversion
[NASA-CR-176777] N86-25042
SPACECRAFT PROPULSION
Generation of free radicals and ions for spacecraft propulsion
[NASA-CR-176672] N86-24751
SPACECRAFT STABILITY
The effect of energy dissipation due to friction at the joint of a simple beam structure
[AD-A163975] N86-24739
Adaptive control techniques for large space structures
[AD-A164240] N86-24742

SPACECRAFT STRUCTURES
Selections from Flug Revue und Flugwelt International. A. On the border of Time-hypersonic flight. B. NASA programs pave the way for the hypersonic aircraft. C. Shuttle flight 61-B; construction in space. D. Faster than a bullet; hypersonic military aircraft
[NASA-TM-88418] N86-24652
Control of a large space structure using direct output feedback and modal suppression
[AD-A163960] N86-24738
SPACELAB
Ground Software Maintenance Facility (GSMF) system manual
[NASA-CR-178804] N86-25143
SPARKS
Altitude ignition/lean decel study
[AD-A163052] N86-24781
SPATIAL DISTRIBUTION
The axial injection TEM orbitron maser
[AD-A164166] N86-24985
SPECIFIC HEAT
A dimensional analysis approach for characterizing pryotechnic mixture systems
[AD-A163018] N86-24863
SPECIFIC IMPULSE
Performance and endurance tests of a multipropellant resistojet for space station auxiliary propulsion
[NASA-TM-87278] N86-24748
Calculated research on the energetic characteristic of TN in composite solid propellant
[AD-A163691] N86-24859
SPECIMEN GEOMETRY
Analysis of the stress state in an Iosipescu sheartest specimen
[NASA-CR-176745] N86-24755
SPECTRAL EMISSION
Nonparametric and parametric estimation of wave statistics and spectra
[PB86-141967] N86-25105
SPECTRAL RECONNAISSANCE
Earth resources: A continuing bibliography with indexes (issue 49)
[NASA-SP-7041(49)] N86-25033
SPECTRAL RESOLUTION
Analysis of contrast sensitivity and spectral response of imaging systems
[AD-A164228] N86-25247
SPECTRAL SENSITIVITY
Analysis of contrast sensitivity and spectral response of imaging systems
[AD-A164228] N86-25247
SPECTRAL SIGNATURES
Spectral characteristics of radar echoes from aircraft-dispensed chaff N86-24904
SPECTROSCOPIC TELESCOPES
Remote measurement of the atmospheric isoplanatic angle and determination of refractive turbulence profiles by direct inversion of the scintillation amplitude covariance function with Tikhonov regularization
[AD-A163629] N86-25239
SPECTROSCOPY
Energy and chemical change
[AD-A164147] N86-25231
Excitation anisotropy in laser-induced-fluorescence spectroscopy: Broad-line excitation case
[IPPJ-761] N86-25254
International Ultraviolet Explorer Atlas of O-typespectra from 1200 to 1900 angstrom
[NASA-RP-1155] N86-25307
SPECTRUM ANALYSIS
Spectral characteristics of radar echoes from aircraft-dispensed chaff N86-24904
Water jet/spray measurement analysis
[NASA-CR-178802] N86-24930
Metallicity and the level of the ultraviolet rising branch in elliptical galaxies
[NASA-CR-176670] N86-25311
SPEECH
The structures of discourse structure
[AD-A163024] N86-25172
SPHERES
Analytic solution of the molecular Ornstein-Zernike equation for non-spherical molecules spheres with anisotropic surface adhesion
[AD-A163451] N86-24771
SPHERICAL HARMONICS
Dynamically supported geoid highs over hotspots: Observation and theory
[NASA-CR-176766] N86-25069
SPHERICAL SHELLS
FORTRAN program for vibration and sound radiation of spherical shell
[AD-A163752] N86-25022
SPIN DYNAMICS
The detumbling of an axially symmetric satellite with an orbital maneuvering vehicle by nonlinear feedback control
[AD-A163989] N86-24717
Stability of spinning ICBM (intercontinental ballistic missile) in first stage boost phase
[AD-A164019] N86-24724
SPIN STABILIZATION
The detumbling of an axially symmetric satellite with an orbital maneuvering vehicle by nonlinear feedback control
[AD-A163989] N86-24717
SPLASHING
Experimental assessment of advanced Stirling component concepts
[NASA-CR-174994] N86-25302
SPLINE FUNCTIONS
Nonparametric and parametric estimation of wave statistics and spectra
[PB86-141967] N86-25105
Examination of the Circle Spline routine
[DE86-004361] N86-25161
Convergence of cubic spline interpolation with the Not-A-Knot condition
[AD-A163705] N86-25190
SPRAY CHARACTERISTICS
Water jet/spray measurement analysis
[NASA-CR-178802] N86-24930
SPRAYED COATINGS
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 1. Sections 1 to 8
[AD-A163670] N86-24822
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 2: Appendices A3, A4, A6, A8
[AD-A163671] N86-24823
SPRAYERS
Liquid seeding atomizer
[NASA-CASE-ARC-11631-1] N86-24935
SPRINGS (ELASTIC)
Evaluation of a double Gimbal IPACS design
[NASA-CR-178040] N86-24745
SQUID (DETECTORS)
Superconducting quantum devices, summary and conclusions
[DE86-001978] N86-25283
STABILITY
Natural laminar flow flight experiments on a swept wing business jet-boundary layer stability analyses
[NASA-CR-3975] N86-24659
L(2) stability for weak solutions of the Navier-Stokes equations in R(3)
[AD-A163612] N86-24942
Remote sensing of atmospheric winds by utilizing speckle-turbulence interaction and optical heterodyne detection
[AD-A164187] N86-25087
Kink stability of long ion layers
[IPPJ-758] N86-25250
Tail anisotropy instability during plasma current rise by lower-hybrid waves in a tokamak
[IPPJ-756] N86-25251
STACKS
Metal cluster topology. Part 3: Platinum carbonyl clusters
[AD-A164241] N86-24830
STAGNATION POINT
Experimental study of the supersonic turbulent boundary layer on a blunted axisymmetric body
[AD-A163736] N86-24669
STAINLESS STEELS
Evaluation of a double Gimbal IPACS design
[NASA-CR-178040] N86-24745
Reasons for low plasticity of steel of Type 25-20
[BLL-36604-SER-M-5828.4] N86-24790
Properties of 14Kh17N2 steel in corrosive environment
[BLL-M-36691-(5828.4)] N86-24794
Heat treatment of tool joints for drill pipes
[BLLD-5828.4-M-36669] N86-24802
Some advances in fracture studies under the Heavy-Section Steel Technology Program
[TI85-018096] N86-25029
Research animal stanchion and transporter
[AD-A163907] N86-25110
STANDARDS
Radiometric calibration procedures using the NBS (National Bureau of Standards) MARBLE electronics package
[PB86-129756] N86-24721
Relying on progress of technology, to develop our alloy steel
[AD-A163690] N86-24825
Proceedings of Confsrence on International Standards
[PB86-130044] N86-24872
STARK EFFECT
Quantum mechanical atomic energy operator
[AD-A163839] N86-25226
Studies of autoionizing states relevant to dielctronic recombination
[DE86-002908] N86-25264
STARS
Remote measurement of the atmospheric isoplanatic angle and determination of refractive turbulence profiles by direct inversion of the scintillation amplitude covariance function with Tikhonov regularization
[AD-A163629] N86-25239
STATE ESTIMATION
Use of state estimation to calculate angle-of-attack position error from flight test data
[AD-A163962] N86-24670
State estimation procedure based upon the duality concept
[INPE-3796-PRE/891] N86-25179
STATIC LOADS
Behaviour of dynamically loaded pipes with circumferential flaws under internal pressure and external bending loads
[BLL-RISLEY-TR-5278-(9091.9F)] N86-25010
STATISTICAL ANALYSIS
ALESEP. Part 2: A computer program for the analysis of leading edge separation bubbles on infinite swept wings
[NASA-CR-178015] N86-24664
Simulation of chaff cloud signature
[AD-A164106] N86-24898
RADC (Rome Air Development Center) nonelectronic reliability notebook. Revision B
[AD-A163900] N86-25007
Nonparametric and parametric estimation of wave statistics and spectra
[PB86-141967] N86-25105
Modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises tests for the Pareto distribution with unknown location and scale parameters
[AD-A163837] N86-25193
A fuzzy set approach to vulnerability analysis AD-A163921 BRL-TR-2697 HC A03/MF A01
[AD-A163921] N86-25196
STATISTICAL CORRELATION
Statistical correlation analysis for comparing vibration data from test and analysis
[NASA-TM-86081] N86-25018
STATISTICAL DECISION THEORY
Modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises tests for the Pareto distribution with unknown location and scale parameters
[AD-A163837] N86-25193
STATISTICAL DISTRIBUTIONS
Statistical prediction of dynamic distortion of inlet flow using minimum dynamic measurement. An application to the Melick statistical method and inlet flow dynamic distortion prediction without RMS measurements
[NASA-CR-176764] N86-24933
Modeling transport by convective clouds for regional air pollution models
[PB86-144623] N86-25060
Tests for the extreme value and Weibull distributions based on normalized spacings
[AD-A163566] N86-25182
A comparison of estimation techniques for the three parameter Pareto distribution
[AD-A163831] N86-25192
A modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises test for the Cauchy distribution with unknown location and scale parameters
[AD-A164204] N86-25208
STATISTICAL TESTS
Verification of a Monte Carlo simulation method to find lower confidence limits for the availability and relisbility of maintained systems
[AD-A163832] N86-25005
Tests for the extreme value and Weibull distributions based on normalized spacings
[AD-A163566] N86-25182
STATORS
Combined fringe and Fabry-Perot laser anemometer for three component velocity measurements in turbine stator cascade facility
[NASA-TM-87322] N86-24967
STEADY FLOW
Separated flows
[AD-A163551] N86-24939
Adaptive-grid optimization for minimizing steady-state, truncation error
[AD-A164038] N86-24948

STEADY STATE
Simulation and performance of brushless dc motor actuators
[AD-A163725] N86-24913
Adaptive-grid optimization for minimizing steady-state, truncation error
[AD-A164038] N86-24948
Experimental investigation of turbulent heat transfer in straight and curved rectangular ducts
[AD-A164142] N86-24950

STEAM
Chemical Thermodynamics in Steam Power Cycles Data Requirements
[PB86-130937] N86-24787

STEELS
Using REM oxides to modify steel
[BLL-M-36639-(5828.4)] N86-24791
Deposition of chromium carbides on steel in atmosphere of carbon tetrachloride
[BLL-M-36693-(5828.4)] N86-24795
Influence of oxidation on coefficient of hydrogen diffusion in meraging steels
[BLL-M-36647-(5828.4)] N86-24808
Influence on wear of translational velocity of specimens during laser borizing of steel
[BLL-M-36646-(5828.4)] N86-24809
Influence of annealing temperature on ductile properties of steel wire
[BLL-M-36645-(5828.4)] N86-24810
Relying on progress of technology, to develop our alloy steel
[AD-A163690] N86-24825
Physico-chemical factors affecting hydrothermal resistance and bonding of polymeric composites to steel surfaces
[AD-A163906] N86-24852
Static and dynamic tensile tests on wide X 6 CrNi 18 11 steel plates to demonstrate the integrity of the reactor tank for the SNR 300 fast sodium-cooled reactor
[BLL-RISLEY-TR-5280-(9091.9F)] N86-25009
Determination of main strength properties of 9KhF roll steel
[BLL-M-36651-(5828.4)] N86-25014
Dynamic moire interferometry in mechanics research
[DE86-004128] N86-25028

STELLAR EVOLUTION
The great observatories for space astrophysics
[NASA-CR-176754] N86-24712
Molecular outflows and mass loss in pre-main-sequence stars N86-25309

STELLAR MOTIONS
On stellar streaming motions in triaxial objects: The case of the galactic bulge N86-25308

STELLAR RADIATION
A polarimetric study of the insterstellar medium in Taurus dark clouds N86-25306
B and V photoelectric photometry and light curve solution of the interacting binary systems Hi Puppis,BI Eridani and Sy Horologii N86-25314

STELLAR WINDS
International Ultraviolet Explorer Atlas of O-typespectra from 1200 to 1900 angstrom
[NASA-RP-1155] N86-25307

STELLARATORS
Lectures on topics in magnetic reconnection and transport in fusion devices
[IPPJ-762] N86-25255

STEREOSCOPIC VISION
A robot vision system
[AD-A164202] N86-24999
Real-time adaptive control of a robotic manipulator using three-dimensional stereoscopic vision feedback N86-25175

STIRLING CYCLE
Experimental assessment of advanced Stirling component concepts
[NASA-CR-174994] N86-25302
Stirling Powered Van Progam overview
[NASA-TM-87227] N86-25303

STOCHASTIC PROCESSES
Failure times in maintenance models
[AD-A163891] N86-25006
Maximum likelihood recursion and stochastic approximation in sequential designs
[AD-A163628] N86-25188
Energy and chemical change
[AD-A164147] N86-25231

STOKES LAW OF RADIATION
High resolution coherent anti-Stokes Raman spectroscopy of deuterium gas
[AD-A163946] N86-24779

STORAGE STABILITY
Development of a test method to determine potential peroxide content in turbine fuels
[AD-A163590] N86-24858

STORM DAMAGE
Los Angeles, California tornado of March 1, 1983
[PB86-141991] N86-25089

STORMS (METEOROLOGY)
Loads and motions of an F-106B flying through thunderstorms
[NASA-TM-87671] N86-24672

STRAIN GAGES
Inductive energy for rapid strain guage attachment
[NASA-CASE-LAR-13237-1] N86-24960

STRAIN RATE
On K-BKZ and other viscoelastic models as continuum generalization of the classical Spring-Dashpot models
[AD-A163703] N86-24943

STRATIFICATION
On stratification and wind-induced mixing in the Chesapeake Bay N86-25107

STRATIFIED FLOW
On stratification and wind-induced mixing in the Chesapeake Bay N86-25107

STRATOSPHERE
Stratospheric tritium sampling
[DE86-004368] N86-25059

STRATUS CLOUDS
Satellite cloud and precipitation analysis using a minicomputer
[AD-A163821] N86-25084

STREAK PHOTOGRAPHY
Hall station and camera system operation and maintenance manual
[NASA-CR-178836] N86-24966

STRESS (PHYSIOLOGY)
A review of the pilot backache problem in the CH113 Labrador helicopter
[AD-A164011] N86-25113

STRESS ANALYSIS
Analysis of the stress state in an Iosipescu sheartest specimen
[NASA-CR-176745] N86-24755
Three dimensional finite element analysis of failure in composite laminates N86-24768
Determination of stress state from strain state
[BLL-M-36642-(5828.4)] N86-25015
A computational model for contact stress problems AD-A164190
[AD-A164190] N86-25027

STRESS CONCENTRATION
Analysis of the stress state in an Iosipescu sheartest specimen
[NASA-CR-176745] N86-24755
A unique set of micromechanics equations for high temperature metal matrix composites
[NASA-TM-87154] N86-24757
Damage models for delamination and transverse fracture in fibrous composites
[AD-A164164] N86-24765
Determination of stress state from strain state
[BLL-M-36642-(5828.4)] N86-25015

STRESS CYCLES
Advanced processing and properties of high performance alloys
[AD-A163469] N86-24820

STRESS INTENSITY FACTORS
A database for compounding stress intensity factors
[AD-A163779] N86-25023

STRESS MEASUREMENT
Mechanics of field-consistency in finite element analysis: A penalty function approach
[NAL-TM-ST-8514] N86-25180

STRESS RELAXATION
Effects of state recovery on creep buckling under variable loading
[NASA-CR-175094] N86-25310

STRESS WAVES
Stress waves in transversely isotropic media: The homogeneous problem
[NASA-CR-3977] N86-25002

STRESS-STRAIN RELATIONSHIPS
Behaviour of WB 35 pipe steel under dynamic loading in high-speed tensile tests
[BLL-RISLEY-TR-5279-(9091.9F)] N86-25011
Determination of stress state from strain state
[BLL-M-36642-(5828.4)] N86-25015
Stress-strain behavior and failure uniaxial composites in combined compression and shear-2
[AD-A163477] N86-25020

STRIP TRANSMISSION LINES
Joint services electronics program
[AD-A164151] N86-24924

STRUCTURAL ANALYSIS
Control of a large space structure using direct output feedback and modal suppression
[AD-A163960] N86-24738
Advanced orbit transfer vehicle propulsion system study
[NASA-CR-174843] N86-24746
Structure and mixing in turbulent shear flows
[AD-A163584] N86-24940
Nonlinear earthquake analysis of concrete building structures
[AD-A163517] N86-25021
CADS: A Computer Aided Design System, volume 1
[AD-A163556] N86-25147
The structures of discourse structure
[AD-A163024] N86-25172
Properties of organic superconductors
[AD-A163573] N86-25274

STRUCTURAL BASINS
Current variability near the southeast Newfoundland ridge
[AD-A163644] N86-25102

STRUCTURAL DESIGN
Theoretical and material studies on thin-film electroluminescent devices
[NASA-CR-176710] N86-24905
Structural design and kinematic configuration of two-armed robots
[NASA-TM-88419] N86-25000
Advanced on-site power plant development technology program
[NASA-CR-174709] N86-25040

STRUCTURAL DESIGN CRITERIA
Space Station Systems: A bibliography with indexes (supplement 1)
[NASA-SP-7056(01)] N86-24711
Advanced orbit transfer vehicle propulsion system study
[NASA-CR-174843] N86-24746
Study of the effects of discretizing quantitative feedback theory analog control system designs
[AD-A164209] N86-25174
Disposal of high-level radioactive wastes in the unsaturated zone: Technical considerations and response to comments
[TI86-900170] N86-25236

STRUCTURAL ENGINEERING
The effect of energy dissipation due to friction at the joint of a simple beam structure
[AD-A163975] N86-24739

STRUCTURAL FAILURE
Structural performance of space station trusses with missing members
[NASA-TM-87715] N86-24731

STRUCTURAL MEMBERS
Structural optimization by generalized, multilevel decomposition
[NASA-TM-87605] N86-24686
Structural performance of space station trusses with missing members
[NASA-TM-87715] N86-24731
Detection and location of ballistic damage in composite materials using acoustic emission methods
[AD-A164183] N86-24766

STRUCTURAL RELIABILITY
Structural performance of space station trusses with missing members
[NASA-TM-87715] N86-24731

STRUTS
Structural performance of space station trusses with missing members
[NASA-TM-87715] N86-24731

STUDENTS
Education and computers: An AI (Artificial Intelligence) perspective
[AD-A163618] N86-25170

SUBROUTINE LIBRARIES (COMPUTERS)
Examination of the Circle Spline routine
[DE86-004361] N86-25161

SUBSONIC FLOW
USSAERO version D computer program development using ANSI standard FORTRAN 77 and DI-3000 graphics
[NASA-CR-3980] N86-24660

SUBSONIC SPEED
Numerical flow field calculations for a missile configuration at M = .6
[AD-A164155] N86-24951

SUBSTITUTES
Review of modified hemoglobin solutions for use as temporary blood substitutes
[AD-A164210] N86-25114

SUBSTRATES
Diffusion oxygen barrier coating A02/MF A01
[NASA-CASE-LAR-13474-1-SB] N86-24814
Improved piston ring materials for 650 deg C service
[NASA-CR-175058] N86-24845
VMJ solar cell fabrication process using mask aligner
[AD-D011966] N86-25050

SUBSTRUCTURES
Structural optimization by generalized, multilevel decomposition
[NASA-TM-87605] N86-24686

SULFATES
Corrosion of nickel and cobalt base alloys in sulfate melts at 750 deg C
[NASA-CR-175111] N86-24817
SULFONES
PES (plasticizer) levels of a BSL 914 resin (CEAT C76 reference) from different standards
[PB86-120854] N86-24789
SUPERCONDUCTORS
Properties of organic superconductors
[AD-A163573] N86-25274
Thin film technology of high-critical-temperature superconducting electronics
[AD-A136053] N86-25278
Superconducting quantum devices, summary and conclusions
[DE86-001978] N86-25283
SUPERCOOLING
An assessment of data quality and quantity from airborne cloud physics projects from 1974 through 1984
[DOT/FAA/CT-85/37] N86-25079
On the two-phase Stefan problem with interfacial energy and entropy
[AD-A163715] N86-25211
SUPERCRITICAL FLUIDS
Transport and relaxation processes in supercritical fluids
[DE86-002921] N86-24785
SUPERFLUIDITY
Thermal performance evaluation of the infrared telescope dewar subsystem
[NASA-TM-86543] N86-25305
SUPERHEATING
On the two-phase Stefan problem with interfacial energy and entropy
[AD-A163715] N86-25211
SUPERLATTICES
Structural study of multilayered vanadium/nickel superlattices
[DE85-018396] N86-24831
SUPERSATURATION
A characterization of the chemical vapor deposition of gallium arsenide and indium phosphide in the hydride and chloride systems
[AD-A164259] N86-25279
SUPERSONIC AIRCRAFT
Use of state estimation to calculate angle-of-attack position error from flight test data
[AD-A163962] N86-24670
Low-speed performance of an axisymmetric, mixed-compression, supersonic inlet with auxiliary inlets
[NASA-TP-2557] N86-24694
SUPERSONIC BOUNDARY LAYERS
Experimental study of the supersonic turbulent boundary layer on a blunted axisymmetric body
[AD-A163736] N86-24669
SUPERSONIC FLOW
USSAERO version D computer program development using ANSI standard FORTRAN 77 and DI-3000 graphics
[NASA-CR-3980] N86-24660
Separated flows
[AD-A163551] N86-24939
Adaptive-grid optimization for minimizing steady-state, truncation error
[AD-A164038] N86-24948
SUPERSONIC INLETS
Low-speed performance of an axisymmetric, mixed-compression, supersonic inlet with auxiliary inlets
[NASA-TP-2557] N86-24694
SUPERSONIC WAKES
Experimental study of the supersonic turbulent boundary layer on a blunted axisymmetric body
[AD-A163736] N86-24669
SUPPORTS
Structural optimization by generalized, multilevel decomposition
[NASA-TM-87605] N86-24686
A review of the pilot backache problem in the CH113 Labrador helicopter
[AD-A164011] N86-25113
SUPPRESSORS
Control of a large space structure using direct output feedback and modal suppression
[AD-A163960] N86-24738
SURFACE DISTORTION
Physical optics model of side lobe nulling by discs on a parabolic reflector
[AD-A163826] N86-24889
SURFACE ENERGY
Adhesion and the surface behavior of the silicone elastomer
[AD-A163815] N86-24851
SURFACE FINISHING
Method to reveal microstructures in single phase alloys
[AD-D012020] N86-24826
SURFACE PROPERTIES
Adequacy of surface analytical tools for studying the tribology of ceramics
[NASA-TM-87308] N86-24837
SURFACE REACTIONS
Analytic solution of the molecular Ornstein-Zernike equation for non-spherical molecules spheres with anisotropic surface adhesion
[AD-A163451] N86-24771
A model for oxygen atom recombination on a silicon dioxide surface
[AD-A163990] N86-24782
Influence of oxidation on coefficient of hydrogen diffusion in meraging steels
[BLL-M-36647-(5828.4)] N86-24806
Influence on wear of translational velocity of specimens during laser borizing of steel
[BLL-M-36646-(5828.4)] N86-24809
Lubricant foaming and aeration study, part 2
[AD-A163696] N86-24849
Microenvironmental moisture research
[AD-B157859] N86-25004
Vibrational energy transfer at a liquid gallium surface. Activation of unimolecular cyclobutene isomerization
[AD-A163023] N86-25230
Overlayer-induced enhanced oxidation of GaAs surfaces
[AD-A163450] N86-25270
Schottky barrier surface science
[AD-A163574] N86-25275
SURFACE ROUGHNESS
Effects of surface roughness on pressure distribution and boundary layer over compressor blades at high Reynolds number in a two-dimensional cascade
[AD-A163974] N86-24946
SURFACE ROUGHNESS EFFECTS
Effects of surface roughness on pressure distribution and boundary layer over compressor blades at high Reynolds number in a two-dimensional cascade
[AD-A163974] N86-24946
SURFACE TEMPERATURE
Effect of forced convection heat transfer on weld pools
[AD-A163970] N86-24998
SURFACE VEHICLES
A robot vision system
[AD-A164202] N86-24999
SURGERY
Research animal stanchion and transporter
[AD-A163907] N86-25110
SWEPT WINGS
Natural laminar flow flight experiments on a swept wing business jet-boundary layer stability analyses
[NASA-CR-3975] N86-24659
ALESEP. Part 2: A computer program for the analysis of leading edge separation bubbles on infinite swept wings
[NASA-CR-178015] N86-24664
Experimental study of apex fences for lift enhancement on a highly swept delta wing configuration
[AD-A163877] N86-24705
SWITCHING
Analysis of integrated and nonintegrated voice and data networks for DoD communications
[AD-A164176] N86-24899
SYMMETRY
Experimental study of the supersonic turbulent boundary layer on a blunted axisymmetric body
[AD-A163736] N86-24669
Search for right-handed currents by means of muon spin rotation
[DE86-002870] N86-25233
SYNAPSES
Multidisciplinary studies on excitatory amino acids as transmitters in the brain
[AD-A164258] N86-25115
SYNCHRONISM
Distributed FIFO allocation of identical resources using small shared space
[AD-A163988] N86-24716
Circuits and exchange parameters at the C2 interface in the case of sequential input-output of discrete information
[AD-A163686] N86-24884
SYNCHRONOUS SATELLITES
Nickel hydrogen battery cell testing data base: An industry and government survey
[AD-A163017] N86-25051
SYNCHROTRON RADIATION
Overlayer-induced enhanced oxidation of GaAs surfaces
[AD-A163450] N86-25270
The possible importance of synchrotron/inverse Compton losses to explain fast MM-wave and hard X-ray emission of a solar event
[NASA-TM-88659] N86-25316
SYNOPTIC METEOROLOGY
Empirical and modeled synoptic cloud climatology of the Arctic Ocean
[NASA-CR-176752] N86-25078
Applications of wind empirical orthogonal functions in tropical cyclone motion studies
[AD-A164170] N86-25086
SYNTHESIS (CHEMISTRY)
Synthesis of alkyl and aryl phosphazene high polymers
[AD-A163543] N86-24848
Method for making heterocyclic block copolymer
[AD-D011971] N86-24853
Protected ethynylated phenols
[AD-D012019] N86-24854
SYNTHETIC APERTURES
Computer model of a passive synthetic aperture imaging system
[AD-A164144] N86-25158
SYNTHETIC RESINS
Advanced artificial dielectric materials for millimeter wavelength applications. Part A
[AD-A164195] N86-24925
SYSTEM EFFECTIVENESS
System life and reliability modeling for helicopter transmissions
[NASA-CR-3967] N86-24990
A network monitoring facility for a distributed data base management system
[AD-A164129] N86-25297
SYSTEM FAILURES
Aircraft accident/incident summary reports: Denver, Colorado, August 19, 1983; Blountville, Tennessee, July 16, 1983; Tucson, Arizona, February 6, 1983, Cockeysville, Maryland, April 28, 1984; Akron, Ohio, September 30, 1984; Seattle, Washington, October 18, 1984; Miami, Florida, November 11, 1983
[PB85-910409] N86-24675
SYSTEMS ANALYSIS
A computer modeling methodology and tool for assessing design concepts for the Space Station Data Management System
[NASA-TM-87647] N86-24737
Content-Addressable Memory manager: Design and evaluation
[AD-A164037] N86-25133
Development of a computer aided design package for control system design and analysis for a personal computer (ICECAP-PC), volume 1
[AD-A163940] N86-25152
SYSTEMS ENGINEERING
Computed centerline MLS (Microwave Landing System) approach demonstration at Washington National Airport
[AD-A163722] N86-24681
Adaptive control techniques for large space structures
[AD-A164240] N86-24742
Adaptive control, learning, and cost-effective sensor systems for robotics or advanced automation systems
[AD-A163615] N86-24996
Mathematical correlation of modal parameter identification methods via system realization theory
[NASA-TM-87720] N86-25019
Conceptual design study: Forest Fire Advanced System Technology (FFAST)
[JPL-PUBL-86-5] N86-25034
Development of a computer aided design package for control system design and analysis for a personal computer (ICECAP-PC), volume 1
[AD-A163940] N86-25152
Development of a computer aided design package for control system design and analysis for a personal computer (ICECAP-PC). Volume 2
[AD-A164044] N86-25156
Study of the effects of discretizing quantitative feedback theory analog control system designs
[AD-A164209] N86-25174
SYSTEMS MANAGEMENT
A computer modeling methodology and tool for assessing design concepts for the Space Station Data Management System
[NASA-TM-87647] N86-24737

T

TAKEOFF
LQG/LTR design of a robust flight controller for the STOL F-15
[AD-A164111] N86-24708

TARGET ACQUISITION
Kalman filter design for the long range intercept function of the F-4E/G fire control system
[AD-A164205] N86-24926
TARGET RECOGNITION
NCTR using a polarization-agile coherent radar system
[AD-A163528] N86-24882
Analysis of a distributed decision algorithm
[AD-A164181] N86-25159
A fuzzy set approach to vulnerability analysis AD-A163921 BRL-TR-2697 HC A03/MF A01
[AD-A163921] N86-25196
TARGETS
Characteristics of Bayesian multiple model adaptive estimation for tracking airborne targets
[AD-A163830] N86-24890
Introduction to the microcomputers for solving radar and electronic warfare problems
[AD-A164143] N86-25135
Infrared background and target measurement HC A05/MF A01
[AD-A163567] N86-25238
Detection and exploitation of vibration induced optical amplitude modulation
[AD-A164179] N86-25244
TARS
Centerville Beach. Project completion report
[AD-A163461] N86-25056
TASKS
The effect of cold training and the wearing of gloves on manual performance in the cold: A comparison of pure ability and operational tasks
[AD-A163893] N86-25124
TECHNOLOGY ASSESSMENT
Conceptual design study: Forest Fire Advanced System Technology (FFAST)
[JPL-PUBL-86-5] N86-25034
Technology assessment: Methods for measuring the level of computer security
[PB86-129954] N86-25140
A definition study of an Advanced Data Collection and Location System (ADCLS)
[NASA-CR-177867] N86-25291
TECHNOLOGY UTILIZATION
The great observatories for space astrophysics
[NASA-CR-176754] N86-24712
Evaluating R and D and new product development ventures: An overview of assessment methods $12.00/MF A01
[PB86-110806] N86-25289
TELECOMMUNICATION
Test results for developing revised LORAN-C protection criteria AD-A164139 DOT-TSC-CG-85-4 DOT-CG-N-1-86 HC A04/MF A01
[AD-A164139] N86-24683
Satellite voice broadcast. Volume 1: Executive summary
[NASA-CR-175016] N86-24875
Satellite voice broadcast. Volume 2: System study
[NASA-CR-175017] N86-24876
Circuits and exchange parameters at the C2 interface in the case of sequential input-output of discrete information
[AD-A163688] N86-24884
Electromagnetic pulse: The fifth factor in the impact of a nuclear explosion
[AD-A163695] N86-24885
Interactive communication channel
[AD-D011968] N86-24893
TELEVISION SYSTEMS
Pseudo-color display of laser radar imagery
[AD-A164213] N86-25246
TEMPERATURE
Monthly and seasonal weather outlook for mid-November to mid-December 1985, volume 39, number 22, November 14, 1985
[PB86-128097] N86-25090
Monthly and seasonal weather outlook for mid-December 1985 to mid-January 1986, volume 39, number 24, December 14, 1985
[PB86-142262] N86-25091
TEMPERATURE DEPENDENCE
Compensation in epitaxial cubic SiC films
[NASA-TM-87269] N86-25267
TEMPERATURE DISTRIBUTION
Dilution jet mixing program, phase 3
[NASA-CR-174884] N86-24938
TEMPERATURE EFFECTS
A unique set of micromechanics equations for high temperature metal matrix composites
[NASA-TM-87154] N86-24757
Residual-stress induced damage in composite materials
[AD-A164191] N86-24767
Influence of oxidation on coefficient of hydrogen diffusion in meraging steels
[BLL-M-36647-(5828.4)] N86-24808
Influence of annealing temperature on ductile properties of steel wire
[BLL-M-36645-(5828.4)] N86-24810
Corrosion of nickel and cobalt base alloys in sulfate melts at 750 deg C
[NASA-CR-175111] N86-24817
Synthesis and properties of elevated temperature P/M aluminum alloys
[AD-A164158] N86-24827
Poly(carbonate-mide) polymer
[NASA-CASE-LAR-13292-1] N86-24841
The buckling of composite cylindrical panels considering environmental effects
[AD-A163878] N86-25024
Environmental tests of metallization systems for terrestrial photovoltaic cells
[JPL-PUBL-85-86] N86-25045
Thermal performance evaluation of the infrared telescope dewar subsystem
[NASA-TM-86543] N86-25305
TEMPERATURE GRADIENTS
Effect of forced convection heat transfer on weld pools
[AD-A163970] N86-24998
TEMPERATURE MEASUREMENT
Dynamic measurement of total temperature, pressure and velocity in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TP-2584] N86-24709
Non-perturbing beam deflection system and method for high repetition rate temperature measurement of combustion flames
[AD-D012154] N86-24780
Investigation of breadboard temperature profiling system for SSME fuel preburner diagnostics
[NASA-CR-178799] N86-24957
Monthly and seasonal weather outlook for January 1986, volume 40, number 1, December 31, 1985
[PB86-142270] N86-25092
TEMPERATURE MEASURING INSTRUMENTS
Total temperature probe buffer amplifier
[AD-D011967] N86-24969
TEMPERATURE PROBES
Non-perturbing beam deflection system and method for high repetition rate temperature measurement of combustion flames
[AD-D012154] N86-24780
Total temperature probe buffer amplifier
[AD-D011967] N86-24969
TEMPERATURE PROFILES
Physical oceanographic data marginal ice zone experiment R/V POLAR QUEEN, June-July 1984
[AD-A163591] N86-25101
TENSILE PROPERTIES
Static and dynamic tensile tests on wide X 6 CrNi 18 11 steel plates to demonstrate the integrity of the reactor tank for the SNR 300 fast sodium-cooled reactor
[BLL-RISLEY-TR-5280-(9091.9F)] N86-25009
TENSILE STRENGTH
Properties of 14Kh17N2 steel in corrosive environment
[BLL-M-36691-(5828.4)] N86-24794
Determination of main strength properties of 9KhF roll steel
[BLL-M-36651-(5828.4)] N86-25014
TENSILE TESTS
Behaviour of WB 35 pipe steel under dynamic loading in high-speed tensile tests
[BLL-RISLEY-TR-5279-(9091.9F)] N86-25011
TENSOR ANALYSIS
Nonparametric and parametric estimation of wave statistics and spectra
[PB86-141967] N86-25105
The bi-metric absolute differential calculus with applications to general relativity N86-25281
TERNARY SYSTEMS
Enthalpies of mixing of alkaline-earth metals with iron and nickel
[BLLD-5828.4-M-36625] N86-24806
TERRAIN
A Model of Airflow and Diffusion in Complex Terrain (MADICT)
[AD-A163819] N86-25083
TEST EQUIPMENT
Apparatus for electrical measurements of thin films from 77 to 1000 K
[NASA-TM-87256] N86-24959
TEST FACILITIES
Feasibility study and verified design concept for new improved hot gas facility
[NASA-CR-178828] N86-24719
TEST FIRING
A data base and analysis program for shuttle main engine dynamic pressure measurements
[NASA-CR-178808] N86-24750
TEST VEHICLES
Electron microscopy observation of electrotransport
[AD-A164107] N86-25213
TEXTS
Braille reading system
[NASA-CASE-LAR-13306-1] N86-25292
THALLIUM COMPOUNDS
The thallium monoborate-boric acid anhydride binary system
[NASA-TM-88393] N86-24770
THEMATIC MAPPING
Ducks Unlimited Joint Research Project
[NASA-TM-88755] N86-25032
THEOREMS
A proof of Grace's theorem by induction
[AD-A163714] N86-25191
THERMAL ABSORPTION
Laser interaction in long-scalelength plasmas
[AD-A163604] N86-25262
THERMAL ANALYSIS
The thallium monoborate-boric acid anhydride binary system
[NASA-TM-88393] N86-24770
Thermokinetic diagram of embrittlement of maraging steel 03N18K9M5T-VD
[BLLD-5828.4-M-36648] N86-24807
THERMAL CYCLING TESTS
Crack growth on a PWR-RPV nozzle corner under cyclic thermal shock load
[BLL-RISLEY-TR-5284-(9091.9F)] N86-25016
THERMAL DISSOCIATION
Degree to which natural gas is dissociated during thermal oxidation pyrolysis
[BLL-M-36630-(5828.4)] N86-24804
THERMAL EXPANSION
Radiation augmented propulsion feasibility
[AD-A163983] N86-24752
Damping characteristics of metal matrix composites
[AD-A163569] N86-24762
THERMAL FATIGUE
Thermal-mechanical fatigue behavior of nickel-base superalloys
[NASA-CR-175048] N86-24818
The science of and advanced technology for cost-effective manufacture of high precision engineering products. Volume 4. Thermal effects on the accuracy of numerically controlled machine tool
[AD-A163598] N86-24871
THERMAL POLLUTION
Comprehensive integrated remote sensing for US Department of Energy applications
[DE86-002101] N86-25036
THERMAL RADIATION
A model for oxygen atom recombination on a silicon dioxide surface
[AD-A163990] N86-24782
THERMAL SHOCK
Crack growth on a PWR-RPV nozzle corner under cyclic thermal shock load
[BLL-RISLEY-TR-5284-(9091.9F)] N86-25016
THERMOCHEMISTRY
Chemical Thermodynamics in Steam Power Cycles Data Requirements
[PB86-130937] N86-24787
Vibrational energy transfer at a liquid gallium surface. Activation of unimolecular cyclobutene isomerization
[AD-A163023] N86-25230
THERMOCLINES
On stratification and wind-induced mixing in the Chesapeake Bay N86-25107
THERMODYNAMIC EFFICIENCY
Development of 3 and 5 kW fuel cell power plants
[AD-A163603] N86-25047
High temperature gas energy transfer
[AD-A163020] N86-25229
THERMODYNAMIC EQUILIBRIUM
Heat treatment of tool joints for drill pipes
[BLLD-5828.4-M-36669] N86-24802
THERMODYNAMIC PROPERTIES
Laser thermal propulsion
[AD-A164163] N86-24753
Thermoviscoplastic nonlinear constitutive relationships for structural analysis of high temperature metal matrix composites
[NASA-TM-87291] N86-24756
Competing unimolecular reactions of flame radicals. Part 1: Isomerization and dissociation of the methoxy radical
[AD-A164154] N86-24783
The thermodynamic particulars of amorphous cobalt alloys
[BLLD-5828.4-M-36658] N86-24797

Optical feedback stabilization of laser diodes for passive resonance ring laser gyro applications
[AD-A163942] N86-24983
Schottky barrier surface science
[AD-A163574] N86-25275

THERMODYNAMICS
Unsteady solution of the boundary layer equations with application to space shuttle tiles
[AD-A164105] N86-24727
Thermal-mechanical fatigue behavior of nickel-base superalloys
[NASA-CR-175048] N86-24818
The science of and advanced technology for cost-effective manufacture of high precision engineering products. Volume 4. Thermal effects on the accuracy of numerically controlled machine tool
[AD-A163598] N86-24871
Stationary motions and incompressible limit for compressible viscous fluids
[AD-A163600] N86-24941

THERMOELECTRIC GENERATORS
Testimony of Fred R. Mynatt, Associate Director for Nuclear and Engineering Technologies, Oak Ridge National Laboratory, before the Subcommittee on Energy Research and Production of the Committee on Science and Technology, US House of Representatives
[DE86-002234] N86-25053

THERMONUCLEAR REACTIONS
Volume produced H(-), D(-) ion source for proton accelerator and thermo-nuclear fusion research by sheet plasma (1)
[IPPJ-760] N86-25253

THERMOVISCOELASTICITY
Thermoviscoplastic nonlinear constitutive relationships for structural analysis of high temperature metal matrix composites
[NASA-TM-87291] N86-24756

THICK PLATES
The determination of the natural frequencies and mode shapes for anisotropic laminated plates including the effects of shear deformation and rotatory inertia
[AD-A164040] N86-24763

THICKNESS RATIO
The determination of the natural frequencies and mode shapes for anisotropic laminated plates including the effects of shear deformation and rotatory inertia
[AD-A164040] N86-24763

THIN FILMS
Non-linear optical techniques for visible and UV lasers and thin film deposition
[AD-A164188] N86-24828
Apparatus for electrical measurements of thin films from 77 to 1000 K
[NASA-TM-87256] N86-24959
Thin film technology of high-critical-temperature superconducting electronics
[AD-A136053] N86-25278

THREE BODY PROBLEM
Motion in the restricted problem of three bodies for small values of the mass parameter N86-25201

THREE DIMENSIONAL BODIES
Question of application of method of finite elements to problems of deformation of incompressible media
[BLLD-5828.4-M-36665] N86-25012

THREE DIMENSIONAL FLOW
Separated flows
[AD-A163551] N86-24939

THRUST LOADS
Two-dimensional confined jet thrust vector control with flow visualization and variable flow geometry
[AD-A164214] N86-24699

THRUST VECTOR CONTROL
Two-dimensional confined jet thrust vector control with flow visualization and variable flow geometry
[AD-A164214] N86-24699
Multivariable control law design for enhanced air combat maneuvering. F-15/STOL (Short Take-Off and Landing) derivative fighter
[AD-A164017] N86-24706

THUNDERSTORMS
Loads and motions of an F-106B flying through thunderstorms
[NASA-TM-87671] N86-24672
The behavior of cloud droplets in an acoustic field: A numerical investigation
[AD-A163704] N86-25081

TIME
Time domain referencing in intensity modulation fiber optic sensing systems
[NASA-CR-175109] N86-24691
Time domain algorithms
[AD-A163054] N86-24895

TIME DEPENDENCE
Quantum mechanical atomic energy operator
[AD-A163839] N86-25226
Energy and chemical change
[AD-A164147] N86-25231

TIME DIVISION MULTIPLEXING
Real-time flight test PCM data acquisition monitor
[AD-A164035] N86-24897
Absolute bounds on set intersection and union sizes from distribution information
[AD-A164025] N86-25199

TIME FUNCTIONS
Aircraft Noise Prediction Program theoretical manual: Propeller aerodynamics and noise
[NASA-TM-83199] N86-25220

TIME MEASUREMENT
Holographic investigation of solid propellant combustion in a three-dimensional motor
[AD-A164217] N86-24864
Jamming effects on digital communication receivers (timing errors and frequency errors)
[AD-A164199] N86-24900

TIME OF FLIGHT SPECTROMETERS
Hall station and camera system operation and maintenance manual
[NASA-CR-178836] N86-24966

TIME SERIES ANALYSIS
Higher order residual analysis for nonlinear time series with autoregressive correlation structures
[AD-A163611] N86-25185

TIME SHARING
Distributed FIFO allocation of identical resources using small shared space
[AD-A163988] N86-24716

TIMOSHENKO BEAMS
Mechanics of field-consistency in finite element analysis: A penalty function approach
[NAL-TM-ST-8514] N86-25180

TIRES
Fireproof hydraulic brake system
[AD-A163542] N86-24688

TISSUES (BIOLOGY)
Multidisciplinary studies on excitatory amino acids as transmitters in the brain
[AD-A164258] N86-25115
Phase-insensitive detection and the method of moments for ultrasonic tissue characterization N86-25223

TITANIUM
Influence of lime additions on silicothermic reduction of titanium
[BLLD-5826.4-M-36638] N86-24803
Diffusion oxygen barrier coating A02/MF A01
[NASA-CASE-LAR-13474-1-SB] N86-24814

TITANIUM ALLOYS
Evaluation of a double Gimbal IPACS design
[NASA-CR-178040] N86-24745
The heat treatment of Ti-Al-V system alloy foil produced by vacuum precipitation
[BLLD-5826.4-M-36668] N86-24801
Effect of forced convection heat transfer on weld pools
[AD-A163970] N86-24998

TITRATION
A volumetric method for titrimetric analysis of hydrogen peroxide
[AD-A163582] N86-24774

TOKAMAK DEVICES
Advanced ICRF antenna design for R-TOKAMAK
[IPPJ-759] N86-25249
Graphical study of electromagnetic wave accessibility in tokamak plasmas near the electron-cyclotron frequency
[INPE-3810-PRE/896] N86-25257
Measurement of density fluctuations on the JIPP T-II tokamak plasma by millimeter and sub-millimeter wave scattering
[IPPJ-766] N86-25261
Energy confinement studies of lower hybrid current driven discharges in the Alcator C tokamak
[DE85-014754] N86-25263
Theoretical studies of magnetized plasma turbulence: Ion-cyclotron turbulence, and shear flow turbulence and its applications to tokamak edge phenomena N86-25265

TOLUENE
Determination of initial chemical steps in the gas-phase decomposition of energetic molecules
[AD-A163751] N86-24777
Chemically induced damage to the hippocampal formation
[NDRE/PUBL-86/1002] N86-25112

TOOLS
A microcomputer-based menu-driven chip layout language
[AD-A164109] N86-24923

TOPOGRAPHY
A one-level mesoscale model for diagnosing surface winds in mountainous and coastal regions N86-25097
Current variability near the southeast Newfoundland ridge
[AD-A163644] N86-25102

TOPOLOGY
Metal cluster topology. Part 3: Platinum carbonyl clusters
[AD-A164241] N86-24830
Low pass filters with linear phase
[AD-A163984] N86-24920
Continuous representations of digital images
[AD-A164189] N86-25245

TORNADOES
Los Angeles, California tornado of March 1, 1983
[PB86-141991] N86-25089

TOXICOLOGY
Isotopic study of the inhalation toxicology of oxidants
[PB86-109485] N86-25116

TRACE CONTAMINANTS
Description of a two-dimensional atmospheric transport model
[DAR-TP-11] N86-25055

TRACKING (POSITION)
An LQG up-and away flight control design for the STOL F-15 aircraft
[AD-A164108] N86-24707
Introduction to the microcomputers for solving radar and electronic warfare problems
[AD-A164143] N86-25135

TRAILING EDGE FLAPS
Experimental study of apex fences for lift enhancement on a highly swept delta wing configuration
[AD-A163877] N86-24705

TRAILING EDGES
Investigation of rolling-up and interaction of leading-edge and trailing-edge vortex sheets on a slender delta wing
[AD-A163692] N86-24668

TRAINING AIRCRAFT
Use of state estimation to calculate angle-of-attack position error from flight test data
[AD-A163962] N86-24670

TRAINING ANALYSIS
Safety study. Airline passenger safety education: A review of methods used to present safety information
[PB85-917014] N86-24676

TRAJECTORIES
Nickel hydrogen battery cell testing data base: An industry and government survey
[AD-A163017] N86-25051
A quantum mechanical investigation of vibrational energy transfer in O ((3)P) + H sub 2 O collisions
[AD-A164159] N86-25232
An analysis of the accessibility of Earth-approaching asteroids
[AD-A163976] N86-25313

TRANSDUCERS
Adjustable mount for electro-optic transducers in an evacuated cryogenic system
[NASA-CASE-LAR-13100-1] N86-24993
A transducer for bottom-scattering measurements
[AD-A163987] N86-25222

TRANSFER FUNCTIONS
Low pass filters with linear phase
[AD-A163984] N86-24920

TRANSFORMATIONS (MATHEMATICS)
Solutions of nonlinear matrix equations
[AD-A163841] N86-25195

TRANSFORMERS
Partial-discharge tests of multiwinding high-voltage transformers for space TWTAs (Traveling-Wave Tube Amplifiers)
[AD-A163882] N86-24915
Calibration of test systems for measuring power losses of transformers
[PB86-132032] N86-24928

TRANSIENT RESPONSE
Compensation in epitaxial cubic SiC films
[NASA-TM-87269] N86-25267

TRANSISTOR CIRCUITS
Designing a 25-kilowatt high frequency series resonant
[NASA-CR-176774] N86-24906
Control circuitry for high speed VLSI (Very Large Scale Integration) winograd fourier transform processors
[AD-A164043] N86-24921

TRANSISTORS
Study and analysis of AlGaAs/GaA modulation doped field-effect transistors incorporating p-type Schottky gate barriers
[AD-A164103] N86-24922

TRANSITION TEMPERATURE
Properties of organic superconductors
[AD-A163573] N86-25274

TRANSMISSION
Parallel image transmission through a single optical fiber
[AD-A163809] N86-25241

TRANSMISSION FLUIDS
Evaluation of Army engine oils in Hydraulic/Power transmission system components
[AD-A163527] N86-24847
TRANSMISSIONS (MACHINE ELEMENTS)
System life and reliability modeling for helicopter transmissions
[NASA-CR-3967] N86-24990
Testing of YUH-61A helicopter transmission in NASA Lewis 2240-kW (3000-hp facility
[NASA-TP-2538] N86-24992
TRANSMITTANCE
LQG/LTR design of a robust flight controller for the STOL F-15
[AD-A164111] N86-24708
TRANSMITTERS
A seawater battery monitor with fiber optic remote data acquisition capability
[AD-A164178] N86-25052
Electron precipitation patterns in the vicinity of a VLF transmitter
[AD-A163716] N86-25072
TRANSONIC FLOW
Numerical solution of the Euler equations by implicit schemes with multiple grids N86-24655
Unsteady transonic flow calculations for wing-fuselage configurations
[NASA-TM-87707] N86-24657
TRANSONIC WIND TUNNELS
R4 airfoil data corrected for sidewall boundary-layer effects in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TP-2565] N86-24662
TRANSPONDERS
Relative positioning of ocean bottom benchmarks AD-A164177 HC A05/MF A01
[AD-A164177] N86-24684
TRANSPORT AIRCRAFT
In-flight measurements of wing ice shapes and wing section drag increases caused by natural icing conditions
[NASA-TM-87301] N86-24667
Wind tunnel technology for the development of future commercial aircraft
[NASA-TM-88390] N86-24710
TRANSPORT PROPERTIES
Transport and relaxation processes in supercritical fluids
[DE86-002921] N86-24785
Description of a two-dimensional atmospheric transport model
[DAR-TP-11] N86-25055
A plasma wave instrument on the AMPTE/IRM (Active Magnetospheric Particle Tracing Explorers/Ion Release Module) spacecraft
[AD-A163048] N86-25074
Theoretical investigation of point defects of mercury cadmium telluride A01
[AD-A163735] N86-25277
TRANSPORTER
Research animal stanchion and transporter
[AD-A163907] N86-25110
TRAPS
Quantum theory of ion motion and laser cooling in a radio frequency quadrupole trap
[AD-A163838] N86-25212
TRAVELING WAVE AMPLIFIERS
Partial-discharge tests of multiwinding high-voltage transformers for space TWTAs (Traveling-Wave Tube Amplifiers)
[AD-A163882] N86-24915
TRAVELING WAVES
Wave attenuation in periodic structures N86-24873
TRIANGLES
Metal cluster topology. Part 3: Platinum carbonyl clusters
[AD-A164241] N86-24830
TRIANGULATION
Surface construction from planar contours
[AD-A163610] N86-25184
TRIBOLOGY
Adequacy of surface analytical tools for studying the tribology of ceramics
[NASA-TM-87308] N86-24837
TRIMETHYL COMPOUNDS
Chemically induced damage to the hippocampal formation
[NDRE/PUBL-86/1002] N86-25112
TRITIUM
Stratospheric tritium sampling
[DE86-004368] N86-25059
TROPICAL REGIONS
Forecast of Atlantic seasonal hurricane activity for 1986 N86-25080
Mariners Weather Log, volume 29, number 4, fall 1985
[PB86-142072] N86-25088
TROPICAL STORMS
Mariners Weather Log, volume 29, number 4, fall 1985
[PB86-142072] N86-25088
TROPOSPHERE
Reliability of navigation service provided by the global positioning system
[AD-A163541] N86-24680
TRUCKS
Stirling Powered Van Progam overview
[NASA-TM-87227] N86-25303
TRUNCATION ERRORS
Adaptive-grid optimization for minimizing steady-state, truncation error
[AD-A164038] N86-24948
TRUSSES
Shuttle-launch triangular space station
[NASA-CASE-10676-1] N86-24729
Structural performance of space station trusses with missing members
[NASA-TM-87715] N86-24731
Deployable geodesic truss structure A01
[NASA-CASE-LAR-13113-1] N86-24867
TUMBLING MOTION
The detumbling of an axially symmetric satellite with an orbital maneuvering vehicle by nonlinear feedback control
[AD-A163989] N86-24717
TUNGSTEN
A mixture model for unidirectionally fiber-reinforced composites
[AD-A164136] N86-24764
TUNGSTEN CARBIDES
Improved piston ring materials for 650 deg C service
[NASA-CR-175058] N86-24845
TURBIDITY
Interparticle interference during light scattering by submicroinhomogeneous glass
[NASA-TM-88407] N86-24843
TURBINE BLADES
One-piece HPTR blade squealer tip
[AD-D012003] N86-24698
Thermoviscoplastic nonlinear constitutive relationships for structural analysis of high temperature metal matrix composites
[NASA-TM-87291] N86-24756
Anisotropy of high temperature strength in precipitation-hardened nickel-base superalloy single crystals
[NASA-TM-88387] N86-24815
Manufacture of ceramic sinters
[NASA-TM-88398] N86-24842
TURBINE ENGINES
Evaluating turbine engine operating characteristics
[FAA-AC-25.939-1] N86-24696
A real-time simulation evaluation of an advanced detection. Isolation and accommodation algorithm for sensor failures in turbine engines
[NASA-TM-87289] N86-24697
Combined fringe and Fabry-Perot laser anemometer for three component velocity measurements in turbine stator cascade facility
[NASA-TM-87322] N86-24967
TURBINE PUMPS
Passive eddy-current damping as a means of vibration control in cryogenic turbomachinery
[NASA-TP-2562] N86-24722
TURBINES
Development of a test method to determine potential peroxide content in turbine fuels
[AD-A163590] N86-24858
Flat plate and turbine vane cascade heat transfer investigation using a shock tube
[AD-A163992] N86-24947
TURBOCOMPRESSORS
Propulsion and Energetics Panel Working Group 14 on suitable averaging techniques in non-uniform internal flows
[AD-A133968] N86-24692
TURBOFAN ENGINES
A real-time simulation evaluation of an advanced detection. Isolation and accommodation algorithm for sensor failures in turbine engines
[NASA-TM-87289] N86-24697
TURBOMACHINERY
Ramp-integration technique for capacitance-type blade-tip clearance measurement
[NASA-TM-87241] N86-24964
TURBOPROP AIRCRAFT
An estimate of the enroute noise of an advanced turboprop airplane NASA-TM-87302 E-3020 NAS 1.15:87302 HC A02/MF A01
[NASA-TM-87302] N86-25217
An experimental investigation of reducing advanced turboprop cabin noise by wing shielding
[NASA-TM-87112] N86-25218
TURBOPROP ENGINES
Cost estimating relationships for fixed wing aircraft: List price versus empty weight
[AD-A164196] N86-25300
TURBULENCE
A computational study of multiple jet and wall interaction
[NASA-TM-86541] N86-24937
Review and evaluation of recent developments in melic inlet dynamic flow distortion prediction and computer program documentation and user's manual estimating maximum instantaneous inlet flow distortion from steady-state total pressure measurements with full, limited, or no dynamic data
[NASA-CR-176765] N86-24955
Monte Carlo simulation of two-particle relative diffusion using Eulerian statistics: Extended abstract
[PB86-116548] N86-25077
Remote measurement of the atmospheric isoplanatic angle and determination of refractive turbulence profiles by direct inversion of the scintillation amplitude covariance function with Tikhonov regularization
[AD-A163629] N86-25239
TURBULENCE EFFECTS
Helicopter rotor noise due to ingestion of atmospheric turbulence
[NASA-CR-3973] N86-25216
TURBULENT BOUNDARY LAYER
Experimental study of the supersonic turbulent boundary layer on a blunted axisymmetric body
[AD-A163736] N86-24669
An experimental investigation on location of boundary layer transition on the NACA 0012 using surface hot film gages
[NASA-TM-88285] N86-24936
TURBULENT FLOW
Contributions to the understanding of large-scale coherent structures in developing free turbulent shear flows
[NASA-CR-176772] N86-24932
Structure and mixing in turbulent shear flows
[AD-A163584] N86-24940
Effects of surface roughness on pressure distribution and boundary layer over compressor blades at high Reynolds number in a two-dimensional cascade
[AD-A163974] N86-24946
Experimental investigation of turbulent heat transfer in straight and curved rectangular ducts
[AD-A164142] N86-24950
Numerical flow field calculations for a missile configuration at M = .6
[AD-A164155] N86-24951
TURBULENT HEAT TRANSFER
Experimental investigation of turbulent heat transfer in straight and curved rectangular ducts
[AD-A164142] N86-24950
TURBULENT MIXING
A computational study of multiple jet and wall interaction
[NASA-TM-86541] N86-24937
TWO DIMENSIONAL BOUNDARY LAYER
Effects of surface roughness on pressure distribution and boundary layer over compressor blades at high Reynolds number in a two-dimensional cascade
[AD-A163974] N86-24946
TWO DIMENSIONAL FLOW
Two-dimensional confined jet thrust vector control with flow visualization and variable flow geometry
[AD-A164214] N86-24699
Separated flows
[AD-A163551] N86-24939
TWO FLUID MODELS
Kink stability of long ion layers
[IPPJ-758] N86-25250

U

U.S.S.R. SPACE PROGRAM
Preliminary results of the Vega 1 and Vega 2 optical investigation of aerosol in the atmosphere of Venus at 30-60 KM
[NASA-TM-88414] N86-25315
UH-1 HELICOPTER
VHF-FM communications antennas for project SINCGARS (UH-1 tail whip and cabin roof bent whip evaluation)
[AD-A163561] N86-24883
ULTRAHIGH FREQUENCIES
Microwave tube collectors. Collector systems of UHF devices with longitudinal interactions
[NASA-TM-88399] N86-24910
ULTRASONIC RADIATION
Phase-insensitive detection and the method of moments for ultrasonic tissue characterization N86-25223

ULTRASONIC SCANNERS
Phase-insensitive detection and the method of moments for ultrasonic tissue characterization N86-25223
ULTRASONIC TESTS
Stress waves in transversely isotropic media: The homogeneous problem
[NASA-CR-3977] N86-25002
ULTRAVIOLET ABSORPTION
Laser probing and modification of MOCVD and VPE reactor kinetics
[AD-A163860] N86-24981
ULTRAVIOLET LASERS
Non-linear optical techniques for visible and UV lasers and thin film deposition
[AD-A164188] N86-24828
An ultraviolet laser shadowgraphy system for the SHIVA-STAR fast capacitor bank
[AD-A163867] N86-24968
Studies on radiative collisional and ultraviolet lasers
[AD-A163901] N86-24982
ULTRAVIOLET RADIATION
Radiation augmented propulsion feasibility
[AD-A163983] N86-24752
High efficiency pulse ultraviolet light source
[AD-D011965] N86-25243
Metallicity and the level of the ultraviolet rising branch in elliptical galaxies
[NASA-CR-176670] N86-25311
ULTRAVIOLET SPECTRA
International Ultraviolet Explorer Atlas of O-typespectra from 1200 to 1900 angstrom
[NASA-RP-1155] N86-25307
ULTRAVIOLET SPECTROSCOPY
Studies on radiative collisional and ultraviolet lasers
[AD-A163901] N86-24982
UNDERGROUND STORAGE
Disposal of high-level radioactive wastes in the unsaturated zone: Technical considerations and response to comments
[TI86-900170] N86-25236
UNDERWATER ENGINEERING
Centerville Beach. Project completion report
[AD-A163461] N86-25056
UNDERWATER STRUCTURES
Physico-chemical factors affecting hydrothermal resistance and bonding of polymeric composites to steel surfaces
[AD-A163906] N86-24852
UNIQUENESS
Remarks on the existence and uniqueness of unbounded viscosity solutions of Hamilton-Jacobi equations
[AD-A163701] N86-25189
UNITED STATES
Managing federal information resources: Report under the Paperwork Reduction Act of 1980
[PB86-247682] N86-25299
UNLOADING
Damage models for delamination and transverse fracture in fibrous composites
[AD-A164164] N86-24765
UNSTEADY FLOW
Numerical solution of the Euler equations by implicit schemes with multiple grids N86-24655
Unsteady transonic flow calculations for wing-fuselage configurations
[NASA-TM-87707] N86-24657
The development of vorticity and vortices from forced unsteady flow separation N86-24671
Propulsion and Energetics Panel Working Group 14 on suitable averaging techniques in non-uniform internal flows
[AD-A133968] N86-24692
Separated flows
[AD-A163551] N86-24939
UPPER ATMOSPHERE
Halogen occultation experiment intergrated test plan
[NASA-TM-87709] N86-24744
URBAN PLANNING
Controlling nonpoint pollution in Virginia's urbanizing areas: An institutional perspective
[AD-A163693] N86-25057
USER MANUALS (COMPUTER PROGRAMS)
Burner liner thermal/structural load modeling: TRANCITS program user's manual
[NASA-CR-174891] N86-24931
Ground Software Maintenance Facility (GSMF) user's manual. Appendices NASA-CR-178806 NAS 1.26:178806 Rept-41849-G159-026-App HC A05/MF A01
[NASA-CR-178806] N86-25144
USER REQUIREMENTS
Concaptual design study: Forest Fire Advanced System Technology (FFAST)
[JPL-PUBL-86-5] N86-25034
Analysis and design of a parameterized protocol converter
[AD-A164171] N86-25137

V

VACUUM
The heat treatment of Ti-Al-V system alloy foil produced by vacuum precipitation
[BLLD-5826.4-M-36668] N86-24801
VALVES
Vapor phase heat transport systems
[DE86-004360] N86-24954
VAN DE GRAAFF ACCELERATORS
A strategy for adoption of accelerator mass spectrometry by the Earth sciences
[TI85-901777] N86-25031
VANADIUM ALLOYS
Structural study of multilayered vanadium/nickel superlattices
[DE85-018396] N86-24831
VANES
Anisotropy of high temperature strength in precipitation-hardened nickel-base superalloy single crystals
[NASA-TM-86387] N86-24815
Flat plate and turbine vane cascade heat transfer investigation using a shock tube
[AD-A163992] N86-24947
VAPOR DEPOSITION
Compensation in epitaxial cubic SiC films
[NASA-TM-87269] N86-25267
A characterization of the chemical vapor deposition of gallium arsenide and indium phosphide in the hydride and chloride systems
[AD-A164259] N86-25279
VAPOR PHASE EPITAXY
A characterization of the chemical vapor deposition of gallium arsenide and indium phosphide in the hydride and chloride systems
[AD-A164259] N86-25279
VAPOR PHASES
Radiation augmented propulsion feasibility
[AD-A163983] N86-24752
Vapor phase heat transport systems
[DE86-004360] N86-24954
VAPORS
Application of an atmospheric pressure sampling mass spectrometer to chlorination reactions
[NASA-TM-87270] N86-24813
Criteria for significance of simultaneous presence of both condensible vapors and aerosol particles on mass transfer (deposition) rates
[NASA-TM-87247] N86-24869
VARIABLE GEOMETRY STRUCTURES
Two-dimensional confined jet thrust vector control with flow visualization and variable flow geometry
[AD-A164214] N86-24699
VARIANCE (STATISTICS)
Simulation of chaff cloud signature
[AD-A164106] N86-24898
Maximum likelihood recursion and stochastic approximation in sequential designs
[AD-A163628] N86-25188
VARIATIONAL PRINCIPLES
Connecting mathematics, science and high technology: Research on solutions to nonlinear partial differential equations, bifurcation phenomena, and constructive methods for implementing the calculus of variations for relevant, physical problems
[AD-A162827] N86-25197
VARIATIONS
Characterization of the consistent weighted regression estimators
[AD-A163605] N86-25183
VECTOR SPACES
A theory for classified quantities
[INPE-3768-PRE/883] N86-25178
VEGA PROJECT
Preliminary results of the Vega 1 and Vega 2 optical investigation of aerosol in the atmosphere of Venus at 30-60 KM
[NASA-TM-88414] N86-25315
VELOCITY
Simulation and performance of brushless dc motor actuators
[AD-A163725] N86-24913
VELOCITY MEASUREMENT
Gyro and accelerometer based navigation system for a mobile autonomous robot
[AD-A164036] N86-24682
Dynamic measurement of total temperature, pressure and velocity in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TP-2584] N86-24709
VENTURI TUBES
Liquid seeding atomizer
[NASA-CASE-ARC-11631-1] N86-24935
VENUS (PLANET)
Preliminary results of the Vega 1 and Vega 2 optical investigation of aerosol in the atmosphere of Venus at 30-60 KM
[NASA-TM-88414] N86-25315
VENUS ATMOSPHERE
Preliminary results of the Vega 1 and Vega 2 optical investigation of aerosol in the atmosphere of Venus at 30-60 KM
[NASA-TM-88414] N86-25315
VERTEBRAL COLUMN
A review of the pilot backache problem in the CH113 Labrador helicopter
[AD-A164011] N86-25113
VERTICAL AIR CURRENTS
Modeling transport by convective clouds for regional air pollution models
[PB86-144623] N86-25060
A diagnostic analysis of the Pyrenees lee wave event of 21-23 March 1982 N86-25098
VERY HIGH FREQUENCIES
VHF-FM communications antennas for project SINCGARS (UH-1 tail whip and cabin roof bent whip evaluation)
[AD-A163561] N86-24883
VERY LARGE SCALE INTEGRATION
Algorithm definition for the VLSI design implementation of the electromagnetic radiation integral
[AD-A163825] N86-24868
Arithmetic circuitry for high speed VLSI Winograd Fourier transform processor
[AD-A163943] N86-24917
Control circuitry for high speed VLSI (Very Large Scale Integration) winograd fourier transform processors
[AD-A164043] N86-24921
A single board multiprocessor for real-time contour surface display generation
[AD-A163587] N86-25129
VERY LOW FREQUENCIES
Electron precipitation patterns in the vicinity of a VLF transmitter
[AD-A163716] N86-25072
VIBRATION
The determination of the natural frequencies and mode shapes for anisotropic laminated plates including the effects of shear deformation and rotatory inertia
[AD-A164040] N86-24763
Testing of YUH-61A helicopter transmission in NASA Lewis 2240-kW (3000-hp facility
[NASA-TP-2538] N86-24992
FORTRAN program for vibration and sound radiation of spherical shell
[AD-A163752] N86-25022
Dynamic and design sensitivity analysis of rigid and elastic mechanical systems with intermittent motion
[AD-A163982] N86-25025
Numerical approximation for the infinite-dimensional discrete-time optimal linear-quadratic regulator problem
[NASA-CR-178061] N86-25176
Dissociative electron attachment to rovibrationally excited molecules
[AD-A163085] N86-25228
Vibrational energy transfer at a liquid gallium surface. Activation of unimolecular cyclobutene isomerization
[AD-A163023] N86-25230
A quantum mechanical investigation of vibrational energy transfer in O ((3)P) + H sub 2 O collisions
[AD-A164159] N86-25232
Detection and exploitation of vibration induced optical amplitude modulation
[AD-A164179] N86-25244
VIBRATION DAMPING
The effect of energy dissipation due to friction at the joint of a simple beam structure
[AD-A163975] N86-24739
VIBRATION ISOLATORS
Ground vibration test of an F-16 airplane with modified decoupler pylons
[NASA-TM-87634] N86-24685
Evaluation of a double Gimbal IPACS design
[NASA-CR-178040] N86-24745
VIBRATION MEASUREMENT
Thermoviscoplastic nonlinear constitutive relationships for structural analysis of high temperature metal matrix composites
[NASA-TM-87291] N86-24756
VIBRATION MODE
Ground vibration test of an F-16 airplane with modified decoupler pylons
[NASA-TM-87634] N86-24685
VIBRATION TESTS
Ground vibration test of an F-16 airplane with modified decoupler pylons
[NASA-TM-87634] N86-24685

Statistical correlation analysis for comparing vibration data from test and analysis
[NASA-TM-86081] N86-25018

VIBRATIONAL STRESS
Advanced turboprop vibratory characteristics
[NASA-CR-174708] N86-24693

VIDEO DISKS
Experiments with digitally mastered LaserVision optical discs
[BBC-RD-1986/1] N86-24976

VIDEO EQUIPMENT
Laser ranging and video display system
[NASA-CASE-MSC-20870-1] N86-24977

VIDEO SIGNALS
Colour encoding and decoding techniques for line-locked sampled PAL and NTSC television signals
[BBC-RD-1986/2] N86-24874

VIDICONS
Shuttering efficiencies of nanosecond-gated photoemissive shutter tubes
[DE85-015728] N86-25248

VINYL POLYMERS
Detection and location of ballistic damage in composite materials using acoustic emission methods
[AD-A164183] N86-24766

VISCOELASTIC DAMPING
On K-BKZ and other viscoelastic models as continuum generalization of the classical Spring-Dashpot models
[AD-A163703] N86-24943

VISCOPLASTICITY
Effects of state recovery on creep buckling under variable loading
[NASA-CR-175094] N86-25310

VISCOSITY
Measurement of viscosity of gaseous mixtures at atmospheric pressure
[NASA-TP-2582] N86-24962
Remarks on the existence and uniqueness of unbounded viscosity solutions of Hamilton-Jacobi equations
[AD-A163701] N86-25189

VISCOUS FLOW
ALESEP. Part 2: A computer program for the analysis of leading edge separation bubbles on infinite swept wings
[NASA-CR-178015] N86-24664
Stationary motions and incompressible limit for compressible viscous fluids
[AD-A163600] N86-24941
L(2) stability for weak solutions of the Navier-Stokes equations in R(3)
[AD-A163612] N86-24942

VISCOUS FLUIDS
Stationary motions and incompressible limit for compressible viscous fluids
[AD-A163600] N86-24941
L(2) stability for weak solutions of the Navier-Stokes equations in R(3)
[AD-A163612] N86-24942

VISIBILITY
Diagnostic study of atmosphere-terrain interaction leading to the formation of dust clouds and poor visibilities over the near east desert areas
[AD-A163890] N86-25085

VISION
Orientation of circular connectors using vision processing
[AD-D012153] N86-24918

VISUAL DISCRIMINATION
An evaluation of color sets for CRT displays
[AD-A163894] N86-25125

VOICE COMMUNICATION
Our wings A01
[AD-A163608] N86-24654
Analysis of integrated and nonintegrated voice and data networks for DoD communications
[AD-A164176] N86-24899

VOICE OF AMERICA
Satellite voice broadcast system study, volume 2
[NASA-CR-174905] N86-24877
Satellite voice broadcase system study. Volume 1: Executive summary
[NASA-CR-174904] N86-24878

VOLCANOES
Dynamically supported geoid highs over hotspots: Observation and theory
[NASA-CR-176766] N86-25069

VOLTAGE CONVERTERS (DC TO DC)
Designing a 25-kilowatt high frequency series resonant
[NASA-CR-176774] N86-24906

VOLUMETRIC ANALYSIS
A volumetric method for titrimetric analysis of hydrogen peroxide
[AD-A163582] N86-24774

VORTEX FLAPS
The behaviour and performance of leading edge vortex flaps
[CAR-8601] N86-24666
Experimental assessment of vortex retaining cavity flaps for maneuverability improvement on delta wing fighter aircraft
[AD-A164104] N86-24690

VORTEX SHEETS
Investigation of rolling-up and interaction of leading-edge and trailing-edge vortex sheets on a slender delta wing
[AD-A163692] N86-24668

VORTEX STREETS
A schlieren and hot-wire investigation of karman vortex streets
[AD-A164101] N86-24949

VORTICES
Vapor-screen flow-visualization experiments in the NASA Langley 0.3-m transonic cryogenic tunnel
[NASA-CR-3984] N86-24661
Investigation of rolling-up and interaction of leading-edge and trailing-edge vortex sheets on a slender delta wing
[AD-A163692] N86-24668
The development of vorticity and vortices from forced unsteady flow separation N86-24671
Experimental study of apex fences for lift enhancement on a highly swept delta wing configuration
[AD-A163877] N86-24705
Review and evaluation of recent developments in melic inlet dynamic flow distortion prediction and computer program documentation and user's manual estimating maximum instantaneous inlet flow distortion from steady-state total pressure measurements with full, limited, or no dynamic data
[NASA-CR-176765] N86-24955
Connecting mathematics, science and high technology: Research on solutions to nonlinear partial differential equations, bifurcation phenomena, and constructive methods for implementing the calculus of variations for relevant, physical problems
[AD-A162827] N86-25197

VORTICITY
The development of vorticity and vortices from forced unsteady flow separation N86-24671
Vorticity production in delayed asymmetric cylindrical implosions
[DE86-004369] N86-24953

VULNERABILITY
A fuzzy set approach to vulnerability analysis AD-A163921 BRL-TR-2697 HC A03/MF A01
[AD-A163921] N86-25196

W

WAFERS
Floating emitter solar cell junction transistor
[NASA-CASE-NPO-16467-1-CU] N86-24908
VMJ solar cell fabrication process using mask aligner
[AD-D011966] N86-25050

WAKES
Unsteady heat transfer and direct comparison to steady-state measurements in a rotor-wake experiment
[NASA-TM-87220] N86-24934

WALL FLOW
Heat transfer in compartment fires near regions of ceiling jet-wall impingement N86-24866
Studies of vertical annular gas-liquid flows N86-24956

WALL TEMPERATURE
High temperature gas energy transfer
[AD-A163020] N86-25229

WALLS
Experimental investigation of turbulent heat transfer in straight and curved rectangular ducts
[AD-A164142] N86-24950

WARFARE
Our wings A01
[AD-A163608] N86-24654
The long-range shelling of Paris and physical chemistry problems of extremely long-range firing
[NASA-TM-88416] N86-24868

WARNING SYSTEMS
Los Angeles, California tornado of March 1, 1983
[PB86-141991] N86-25089

WASTE DISPOSAL
Disposal of high-level radioactive wastes in the unsaturated zone: Technical considerations and response to comments
[TI86-900170] N86-25236

WATER
Analytic solution of the molecular Ornstein-Zernike equation for non-spherical molecules spheres with anisotropic surface adhesion
[AD-A163451] N86-24771
Microenvironmental moisture research
[AD-B157859] N86-25004
A quantum mechanical investigation of vibrational energy transfer in O ((3)P) + H sub 2 O collisions
[AD-A164159] N86-25232

WATER CIRCULATION
On stratification and wind-induced mixing in the Chesapeake Bay N86-25107

WATER FLOW
Current variability near the southeast Newfoundland ridge
[AD-A163644] N86-25102

WATER MANAGEMENT
Controlling nonpoint pollution in Virginia's urbanizing areas: An institutional perspective
[AD-A163693] N86-25057

WATER MASERS
Is G305.8-0.2 a young object?
[INPE-3787-PRE/882] N86-25304

WATER POLLUTION
Comprehensive integrated remote sensing for US Department of Energy applications
[DE86-002101] N86-25036

WATER QUALITY
Water resources data for New York, water year 1984. Volume 2: Long Island
[PB86-137338] N86-25037
Water resources data for Georgia, water year 1984
[PB86-127016] N86-25038

WATER RESOURCES
Water resources data for New York, water year 1984. Volume 2: Long Island
[PB86-137338] N86-25037
Water resources data for Georgia, water year 1984
[PB86-127016] N86-25038

WATER VAPOR
Is G305.8-0.2 a young object?
[INPE-3787-PRE/882] N86-25304

WATER WAVES
Nonparametric and parametric estimation of wave statistics and spectra
[PB86-141967] N86-25105
Management information (Wave Propagation Laboratory, Boulder, Colorado)
[PB86-139524] N86-25106

WATERFOWL
Ducks Unlimited Joint Research Project
[NASA-TM-88755] N86-25032
Outer Continental Shelf Enviromental Assessment Program: Reports of principal investigators, volume 30
[PB86-134756] N86-25063

WAVE ATTENUATION
Wave attenuation in periodic structures N86-24873

WAVE DIFFRACTION
Reverse-wave suppressor mirror effects on CW HF unstable ring laser performance
[AD-A163529] N86-24979

WAVE FUNCTIONS
Superconducting quantum devices, summary and conclusions
[DE86-001978] N86-25283

WAVE INTERACTION
Electron precipitation patterns in the vicinity of a VLF transmitter
[AD-A163716] N86-25072

WAVE PROPAGATION
Technical evaluation report on the ElectromagneticWave Propagation Panel Symposium on Propagation Effects on Military Systems in the High Latitude Region
[AGARD-AR-218] N86-24903
Management information (Wave Propagation Laboratory, Boulder, Colorado)
[PB86-139524] N86-25106
Near-inertial wave propagation in geostrophic shear N86-25108
A solidary wave of a relativistic magnetosonic wave propagating perpendicularly to a magnetic field
[IPPJ-767] N86-25260

WAVE REFLECTION
Design methodology of an automated scattering measurement facility
[AD-A163896] N86-24891

WAVE SCATTERING
Measurement of density fluctuations on the JIPP T-II tokamak plasma by millimeter and sub-millimeter wave scattering
[IPPJ-766] N86-25261

WAVEFORMS
Jamming effects on digital communication receivers (timing errors and frequency errors)
[AD-A164199] N86-24900
Simulation and performance of brushless dc motor actuators
[AD-A163725] N86-24913

Configuration study of new low-loss MM (Millimeter) wave guiding structures
[AD-A163784] N86-24914
Comparison of absorption and radiation boundary conditions using a time-domain three-dimensional finite difference electromagnetic computer code
[AD-A163828] N86-25149

WAVEGUIDE ANTENNAS
Research on devices for integrated millimeter wave systems
[AD-A163903] N86-24916
Advanced ICRF antenna design for R-TOKAMAK
[IPPJ-759] N86-25249

WAVEGUIDE FILTERS
Time domain algorithms
[AD-A163054] N86-24895

WAVEGUIDES
Configuration study of new low-loss MM (Millimeter) wave guiding structures
[AD-A163784] N86-24914
Nonlinear analysis of efficiency enhancement in Ubitron/Free-Electron laser amplifiers
[AD-A163619] N86-24980

WAVELENGTHS
Time domain referencing in intensity modulation fiber optic sensing systems
[NASA-CR-175109] N86-24691

WEAK INTERACTIONS (FIELD THEORY)
Search for right-handed currents by means of muon spin rotation
[DE86-002870] N86-25233

WEAPON SYSTEMS
Measurement of interior ballistic performance using FM/FM radio telemetry techniques
[AD-A164150] N86-24728
A survey of O and S (Operating and Support) cost models
[AD-A163438] N86-25287

WEAPONS
NCTR using a polarization-agile coherent radar system
[AD-A163528] N86-24882

WEAR RESISTANCE
Influence on wear of translational velocity of specimens during laser borizing of steel
[BLL-M-36646-(5828.4)] N86-24809

WEAR TESTS
Abrasion and deformed layer formation of manganese-zinc ferrite in sliding contact with lapping tapes
[NASA-TM-87249] N86-24838

WEATHER
Monthly and seasonal weather outlook for mid-January to mid-February 1986, volume 40, number 2, January 14, 1986
[PB86-145828] N86-25093

WEATHER FORECASTING
Forecast of Atlantic seasonal hurricane activity for 1986 N86-25080
Mariners Weather Log, volume 29, number 4, fall 1985
[PB86-142072] N86-25088
Los Angeles, California tornado of March 1, 1983
[PB86-141991] N86-25089
Monthly and seasonal weather outlook for mid-November to mid-December 1985, volume 39, number 22, November 14, 1985
[PB86-128097] N86-25090
Monthly and seasonal weather outlook for mid-December 1985 to mid-January 1986, volume 39, number 24, December 14, 1985
[PB86-142262] N86-25091
Monthly and seasonal weather outlook for January 1986, volume 40, number 1, December 31, 1985
[PB86-142270] N86-25092
Monthly and seasonal weather outlook for mid-January to mid-February 1986, volume 40, number 2, January 14, 1986
[PB86-145828] N86-25093
National Weather Service (NWS) Southern Region QPF (Quantitative Precipitation Forecasting) Workshop
[PB85-199164] N86-25094

WEATHER MODIFICATION
The behavior of cloud droplets in an acoustic field: A numerical investigation
[AD-A163704] N86-25081

WEIBULL DENSITY FUNCTIONS
Simulation of chaff cloud signature
[AD-A164106] N86-24898
Tests for the extreme value and Weibull distributions based on normalized spacings
[AD-A163566] N86-25182

WEIGHT (MASS)
Journal of Research of the National Bureau of Standards, volume 90, number 4, July-August 1985
[PB86-137627] N86-24786

WEIGHTING FUNCTIONS
Optimal quadratic asymptotic design approach and its applications
[NASA-TM-88389] N86-25177
Characterization of the consistent weighted regression estimators
[AD-A163605] N86-25183
Bias and efficiency of the consistent weighted regression estimators in finite population sampling HC A03/MF A01
[AD-A163601] N86-25203

WEIGHTLESSNESS
Research and competition: Best partners
[NASA-TM-87313] N86-25321

WELD STRENGTH
Method of producing a three-dimensional coordinate grid
[BLLD-5828.4-M-36664] N86-24799

WELDED JOINTS
Effect of forced convection heat transfer on weld pools
[AD-A163970] N86-24998

WHEELS
Gyro and accelerometer based navigation system for a mobile autonomous robot
[AD-A164036] N86-24682

WHIP ANTENNAS
VHF-FM communications antennas for project SINCGARS (UH-1 tail whip and cabin roof bent whip evaluation)
[AD-A163561] N86-24883

WHISKER COMPOSITES
Tailoring multiphase ceramics
[AD-A164010] N86-24855

WHITE NOISE
On detection of number of signals in presence of white noise
[AD-A164211] N86-24927

WIND (METEOROLOGY)
Evaluation of NOGAPS 2.1 (Navy Operational Global Atmospheric Prediction System 2.1) systematic error - winter 1983 - 1984
[AD-A163812] N86-25082
A Model of Airflow and Diffusion in Complex Terrain (MADICT)
[AD-A163819] N86-25083
Remote sensing of atmospheric winds by utilizing speckle-turbulence interaction and optical heterodyne detection
[AD-A164187] N86-25087
Remote monitoring of processes that shape desert surfaces: The Desert Winds Project
[TI86-900108] N86-25099
A compilation of moored current meter and wind recorder data. Volume 38. Long-term upper ocean study (LOTUS) (Moorings 787, 788, 789, 790, 792), April 1983 - May 1984
[AD-A163897] N86-25103

WIND EFFECTS
Remote monitoring of processes that shape desert surfaces: The Desert Winds Project
[TI86-900108] N86-25099
On stratification and wind-induced mixing in the Chesapeake Bay N86-25107

WIND EROSION
Remote monitoring of processes that shape desert surfaces: The Desert Winds Project
[TI86-900108] N86-25099

WIND MEASUREMENT
A one-level mesoscale model for diagnosing surface winds in mountainous and coastal regions N86-25097
A compilation of moored current meter and wind recorder data. Volume 38. Long-term upper ocean study (LOTUS) (Moorings 787, 788, 789, 790, 792), April 1983 - May 1984
[AD-A163897] N86-25103

WIND PROFILES
A diagnostic analysis of the Pyrenees lee wave event of 21-23 March 1982 N86-25098

WIND SHEAR
Near-inertial wave propagation in geostrophic shear N86-25108

WIND TUNNEL MODELS
Vapor-screen flow-visualization experiments in the NASA Langley 0.3-m transonic cryogenic tunnel
[NASA-CR-3984] N86-24661

WIND TUNNEL TESTS
Rotor performance characteristics from an aeroacoustic helicopter wind-tunnel test program
[NASA-TM-87661] N86-24665
Lateral and longitudinal aerodynamic stability and control parameters of the basic vortex flap research aircraft as determined from flight test data
[NASA-TM-87711] N86-24703
Unsteady solution of the boundary layer equations with application to space shuttle tiles
[AD-A164105] N86-24727
An experimental investigation on location of boundary layer transition on the NACA 0012 using surface hot film gages
[NASA-TM-88285] N86-24936
Data analysis on the rotor test stand program for interactive processing
[NASA-TM-77948] N86-25146

WIND TUNNELS
Wind tunnel technology for the development of future commercial aircraft
[NASA-TM-88390] N86-24710

WIND TURBINES
Prediction of the far field noise from wind energy farms
[NASA-CR-177956] N86-25215

WINDPOWERED GENERATORS
Prediction of the far field noise from wind energy farms
[NASA-CR-177956] N86-25215

WINDSHIELDS
Frameless transparencies for aircraft cockpit enclosures
[AD-D012155] N86-24689

WINGS
An experimental investigation of reducing advanced turboprop cabin noise by wing shielding
[NASA-TM-87112] N86-25218

WINTER
Evaluation of NOGAPS 2.1 (Navy Operational Global Atmospheric Prediction System 2.1) systematic error - winter 1983 - 1984
[AD-A163812] N86-25082

WIRE
Influence of annealing temperature on ductile properties of steel wire
[BLL-M-36645-(5828.4)] N86-24810
Relying on progress of technology, to develop our alloy steel
[AD-A163690] N86-24825

WORD PROCESSING
Real-time flight test PCM data acquisition monitor
[AD-A164035] N86-24897

WORK HARDENING
Influence of parameters of microstructure on process of hot deformation of two-phase steel
[BLL-M-36626-(5828.4)] N86-24805

WRIST
Theoretical three-and four-axis gimbal robot wrists
[NASA-TP-2564] N86-25168

X

X RAY ANALYSIS
Deposition of chromium carbides on steel in atmosphere of carbon tetrachloride
[BLL-M-36693-(5828.4)] N86-24795

X RAY DIFFRACTION
Deposition of chromium carbides on steel in atmosphere of carbon tetrachloride
[BLL-M-36693-(5828.4)] N86-24795

X RAY LASERS
Studies on radiative collisional and ultraviolet lasers
[AD-A163901] N86-24982

X RAY SPECTRA
The possible importance of synchrotron/inverse Compton losses to explain fast MM-wave and hard X-ray emission of a solar event
[NASA-TM-88659] N86-25316

X RAY SPECTROSCOPY
Schottky barrier surface science
[AD-A163574] N86-25275

X RAYS
Electromagnetic pulse: The fifth factor in the impact of a nuclear explosion
[AD-A163695] N86-24885
Isolation and characterization of an organogallium-arsenic cluster: Crystal structure of ((PhAsH)(R2Ga)(PhAs)6(RGa)4)(R=Me3SiCH2)
[AD-A163485] N86-25271

XENON LAMPS
High efficiency pulse ultraviolet light source
[AD-D011965] N86-25243

Y

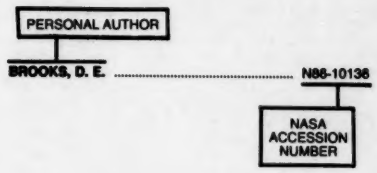
YAW
Use of state estimation to calculate angle-of-attack position error from flight test data
[AD-A163962] N86-24670

YIELD STRENGTH
Method of producing a three-dimensional coordinate grid
[BLLD-5828.4-M-36664] N86-24799

Z

ZINC
Abrasion and deformed layer formation of manganese-zinc ferrite in sliding contact with lapping tapes
[NASA-TM-87249] N86-24838
ZINC COMPOUNDS
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163537] N86-25272
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163559] N86-25273
ZIRCONIUM ALLOYS
Crystallographic texture: Experimental geometry and defocussing correction
[AERE-R-11723] N86-25266

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The NASA accession number denotes the number by which the citation is identified.

A

ABENS, S. N86-25047
ABRAMS, D. P. N86-25021
ACHESON, D. C. N86-24726
ADAMOVSKY, G. N86-24691
ADAMS, D. F. N86-24755
ADAMS, G. F. N86-24783
ADKINS, W. N86-24822
N86-24823
N86-24824
AHEARN, D. G. N86-25066
AHMED, A. H. N86-24718
ALEKSANDROVYCH, A. I. N86-25012
ALEXANDER, P., JR. N86-25045
ALIMOV, V. I. N86-24794
N86-24810
ALLCOCK, H. R. N86-24848
ALLEN, L. M. N86-25008
ALTER, Y. M. N86-24911
ALTEROVITZ, S. A. N86-25267
N86-25268
ALTOZ, F. E. N86-24944
AMANO, T. N86-25249
AMIET, R. K. N86-25216
N86-25219
AMMONS, J. M. N86-25004
ANDERSON, A. G., JR. N86-24978
ANDERSON, R. B. N86-25200
ANDERSON, R. H. N86-25148
ANDERSON, T. J. N86-25279
ANDERSON, W. J. N86-24991
ANDO, G. N86-24842
ANDO, R. N86-25249
ANDREADIS, D. N86-24781
ANDREEV, Y. G. N86-24807
ANDREYEV, N. S. N86-24843
ANGUS, J. E. N86-25007
AQUILA, V. N86-25144
ARMSTRONG, N. A. N86-24726
ARNEY, B. N86-25035
ARNOLD, F. E. N86-24853
N86-24854
ARNOLD, S. N86-24894
ARNOLD, S. M. N86-25310
ASH, R. L. N86-24761
ASMUSSEN, J. N36-24751
ATKINSON, A. N86-25280
AWKER, R. W. N86-24695

B

BABU, C. R. N86-25180
BACHTELL, E. E. N86-24875
N86-24876
BADCOCK, C. C. N86-25051
BAGLIO, R. N86-25276
BAI, Z. D. N86-24927
BAKHTIN, V. G. N86-24800
BANDSTRA, R. W. N86-24724
BANDURRAGA, T. M. N86-25101
BARASH, M. M. N86-24871
BARAZ, V. R. N86-24811
BARKER, L. K. N86-25166
BARLAND, K. S. N86-25005
BARRANGER, J. P. N86-24964
BARRY, R. G. N86-25078
BARSALOU, N. N86-25246
BARTHELMY, S. D. N86-25319
BASS, B. R. N86-25029
BATDORF, S. B. N86-25020
BATINA, J. T. N86-24657
BATTERSON, J. G. N86-24703
BAUM, B. A. N86-24812
BEACH, A. N86-25113
BELASHCHENKO, D. K. N86-24797
BELETSKII, V. V. N86-24793
BELIKOV, A. S. N86-25013
BELL, V. L. N86-24840
BENIGNI, D. R. N86-25162
BERGER, M. S. N86-25197
BERGTHOLD, F. M., JR. N86-24984
BERKA, R. B. N86-24729
BERNARD, J. M. N86-24979
BETTADAPUR, S. S. N86-24875
N86-24876
BEYER, R. A. N86-24778
N86-24857
BHASIN, K. B. N86-24907
BHASKAR, S. K. N86-25157
BILLINGSLEY, G. H. N86-25099
BJORNDAHL, W. D. N86-24845
BLACK, J. P. N86-25248
BLAUER, J. N86-24752
BLOOM, R. J. N86-24682
BLUM, L. N86-24771
N86-24772
BLUME, H. J. C. N86-24880
BOGOMOLOV, A. N. N86-24811
BOLAN, C. J. N86-24971
BONNICE, W. F. N86-24678
BONOLI, P. N86-25263
BORODIN, A. N86-24716
BOUAZIZ, R. N86-24770
BOWLUS, J. A. N86-24763
BOXER, S. G. N86-25054
BOYLE, J. S. N86-25082
BRAGA, J. N86-25317
BRAGINSKI, A. I. N86-25278
BRAZEE, M. N86-24687
BREED, C. S. N86-25099
BREITLING, H. N86-25009
BRENNAN, K. F. N86-24905
BRETZLAFF, R. S. N86-24851
BREUSTEDT, W. N86-25146
BRIKMANIS, C. K. N86-24990
BRINZA, V. N. N86-24754
BRISCOE, M. G. N86-25103
BROWN, G. S. N86-25100
BROWN, L. N86-25031
BRUMBAUGH, R. W. N86-24687
BRYAN, R. H. N86-25029
BUCKLEY, D. H. N86-24838
BUCKLEY, J. D. N86-24960
BUELL, G. R. N86-25038
BUIVAN, N. A. N86-25317
BULMAN, M. J. N86-24952
BURGGRAF, O. R. N86-24939
BURKE, J. M. N86-24985
BURKE, P. R. N86-24745
BURMASTER, C. L. N86-24972
BURNS, J. E. N86-24716
BURNSIDE, W. D. N86-24677
BUTLER, T. G. N86-25018
BUTTERFIELD, A. J. N86-24744
BUZ, M. A. N86-24656
BYRD, R. H. N86-25154

C

CACCAMO, C. N86-24772
CAHILL, J. E. N86-24760
CAMPBELL, D. P. N86-25042
CAMPBELL, W. N86-24937
CANSLER, F. N86-24883
CAPRILE, C. N86-25270
CARALYUS, J. N86-24883
CARCACI, J. G. N86-25037
CARCIELLO, N. R. N86-24852
CARLETON, F. B. N86-24784
CARTWRIGHT, D. J. N86-25023
CASTRO, A. N86-24816
CATES, J. W. N86-24699
CATHCART, J. A. N86-24746
CAZIER, F. W., JR. N86-24685
CHAMIS, C. C. N86-24756
N86-24757
N86-24759
CHAN, R. H. N86-24893
CHAN, W. N86-25006
CHANG, S. N86-25270
CHAREK, D. J. N86-25192
CHEGINI, H. N86-24761
N86-24962
CHEN, Y. S. N86-24933
CHENG, L. J. N86-24908
CHERIVAN, G. N86-24784
CHIUEH, T. N86-25265
CHODZKO, R. A. N86-24979
CHOU, L. C. N86-25084
CHRISTNER, L. G. N86-25049
CHUMACHENKO, E. N. N86-25012
CIARROCCHI, J. A. N86-24893
CLARK, R. K. N86-24814
CLARKE, C. K. P. N86-24874
CLARKE, J. N86-25283
CLEMONS, J. M. N86-24758
CLEVELAND, R. F. N86-25117
CLIFFORD, W. M. N86-24997
CODY, P. D., III N86-25138
COFFEY, D. E., JR. N86-24948
COFFIN, T. N86-24750
COLEMAN, E. N86-24938
COLLETTI, B. W. N86-25195
COOLEY, L. A. N86-24829
COOPER, L. Y. N86-24866
COOPER, T. W. N86-24746
CORONATO, P. A. N86-24745
CORREIA, E. N86-25316
CORRINGRATO, R. M. N86-24746
CORWIN, W. R. N86-25029
COSTA, J. E. R. N86-25316
COTMAN, C. W. N86-25115
COUCOULES, J. S. N86-25174
COUTEE, P. W. N86-24917
COVERT, E. E. N86-24726
COX, K. W. N86-25098
COX, W. G. N86-24774
COYNER, J. V. N86-24875
N86-24876
CRANDALL, M. G. N86-25189
CRANE, R. G. N86-25078
CRIM, F. F. N86-25227
CROASDALE, J. R. N86-24897
CRONAU, S. T. N86-24746
CROOKER, T. W. N86-24829
CROSSLEY, E. A., JR. N86-24993
CROW, S. A. N86-25066
CROW, S. J. N86-25048
CRUZ, R. E. N86-25169
CUELLAR, J. P., JR. N86-24858
CUMMINGS, P. T. N86-24771
CUNNINGHAM, R. E. N86-24722

D

DAMBRA, D. M. N86-25276
DANIELS, J. G. N86-24758
DAVEIGA, H. B. N86-24941
DAVIS, L., JR. N86-25017
DAVIS, R. L. N86-24664
DEASON, V. A. N86-25026
DEBOOR, C. N86-25190
DECKER, A. N86-24958
DECKER, W. L. N86-24674

DELAAT, J. C. N86-24697
DELOACH, W. C. N86-24973
DELUCIA, F. C. N86-25075
DEMARCO, F. W. N86-25150
DEMENTEV, V. B. N86-24799
DEMERJIAN, K. L. N86-25062
DEMIN, S. E. N86-24806
DEMPSEY, D. P. N86-25097
DENG, G. N86-24668
DENG, L. Y. N86-25183
N86-25203
DENNIS, B. R. N86-25316
DENNON, S. R. N86-24955
DERNER, W. J. N86-24991
DERRIG, D. N86-25143
N86-25144
DERYABIN, Y. A. N86-24803
DESPORT, J. A. N86-24833
DEWEESE, M. E. N86-24975
DEWILDE, M. A. N86-24778
DITTMAR, J. H. N86-25217
N86-25218
DITTO, W. J. N86-25300
DOE, B. R. N86-25031
DOLIN, R. M. N86-25161
DOLLING, D. S. N86-24669
DONALDSON, R. W. N86-24978
DONNELLY, R. P., JR. N86-24739
DORSEY, J. T. N86-24731
DUBNIK, G. I. N86-24801
DUKE, E. L. N86-24687
N86-25166
DULING, I. N., III N86-24987
DUNHAM, J. R. N86-25145
DUNIVIN, K. O. N86-25118
DUTILLOY, J. R. N86-24730
DWIGHT, K. N86-25272
N86-25273
N86-25276
DYE, C. A. N86-24862

E

EATON, M. W. N86-24723
ECKERT, E. G. N86-25101
ECKERT, S. B. N86-25164
EDDY, A. C. N86-25035
EDEN, J. G. N86-24828
N86-24981
EDSALL, A. C. N86-24996
EL-NADI, A. M. N86-25256
ELLIOTT, J. W. N86-24665
ELLIS, D. G. N86-24666
ELMORE, D. N86-25031
ENGLER, E. M. N86-25274
ENHOLE, C. N86-24968
ENTING, I. G. N86-25055
EPSTEIN, J. S. N86-25028
EREMEEVA, N. N. N86-24804
ESHELBY, M. E. N86-24679
ESIN, Y. O. N86-24806
ESTES, W. J. N86-24904
EVANS, D. D. N86-25236
EVANS, J. W. N86-24728
EYLON, D. N86-24826

F

FABER, S. M. N86-25311
FAROOQUE, M. N86-25047
FARRELL, C. E. N86-24875
N86-24876
FEDOTOV, V. P. N86-25015
FENNELL, J. F. N86-25071
FETERIS, P. J. N86-25085
FEYNMAN, R. P. N86-24726
FILIOS, P. G. N86-24740
FILLINGIM, P. K. N86-24947
FINE, M. E. N86-24827
FINKELSTEIN, J. M. N86-25007
FIORE, C. N86-25263
FISCHER, M. J. N86-24716
FISHER, R. M. N86-24832
FLEMING, K. R. N86-24717
FLEURY, A. D. N86-25179
FLIPSE, W. J. N86-25037
FLOOD, W. A. N86-25100
FODOR, G. E. N86-24858
FOFONOFF, N. P. N86-25102
FOLLSTAEDT, D. M. N86-24819
FORGIE, S. C. N86-24746
FORTE, V. A., JR. N86-25110
FOSTER, M. P. N86-25081
FOSTER, T. D. N86-25101
FOWLER, J. N86-24721
FOX, A. G. N86-24832
FOX, R. L. N86-24960
FRAY, R. P. N86-24898
FREEDMAN, M. R. N86-24836
N86-24839
FREEDMAN, R. N86-24667
FREITAB, T. A. N86-24851
FREUND, H. P. N86-24980
FRIEDLANDER, B. N86-24895
FRIEDMAN, J. H. N86-25207
FROES, F. H. N86-24826
FU, D. N86-24701
FUJIMOTO, T. N86-25254
FULT, D. W. N86-25007
FULTON, G. B. N86-24693

G

GABELE, P. N86-24865
GALLAGHER, J. J. N86-25042
GALLAGHER, T. F. N86-25264
GALYO, G. G. N86-24950
GANGULY, A. K. N86-24980
GARBER, F. D. N86-24882
GARDNER, J. H. N86-25262
GARNER, H. D. N86-25292
GARRIS, B., JR. N86-25137
GARSHNEK, V. N86-25109
GAVALER, J. R. N86-25278
GEIDERIKH, V. A. N86-24797
GENG, Z. N86-24701
GENZEL, R. N86-25242
GEORGE, P. M. N86-25275
GERASKOV, V. P. N86-24911
GERBA, A., JR. N86-24913
GIBBONS, M. D. N86-24663
GIBSON, J. S. N86-25167
N86-25176
GILLIGAN, J. N86-25140
GINSBERG, M. I. N86-25173
GLADILIN, Y. I. N86-24791
GNEDYKH, V. I. N86-25315
GOEKOGLU, S. A. N86-24869
GOFF, F. N86-25035
GOLDBERG, B. G. N86-24758
GOLDEN, D. M. N86-24777
GOLDMAN, L. J. N86-24967
GOLOMIDOV, A. I. N86-25015
GOODMAN, A. W. N86-25191
GOODRICH, D. M. N86-25107
GOSS, L. P. N86-24780
GOUKER, M. A. N86-25042
GRASSIA, J. N86-25119
GRATACOS, C. N86-24883
GRAY, W. M. N86-25080
GREEN, R. L. N86-25274
GREISSING, J. N86-24667
GREITZER, E. M. N86-25216
GRIEG, J. R. N86-24970
GRIFFITH, G. N86-25143
N86-25144
GRIGORYEV, A. V. N86-25315
GROLIER, M. J. N86-25099
GROSS, D. N86-24788
GROSS, G. L. N86-24708
GROSS, S. H. N86-25070
GROSZ, B. J. N86-25172
GUDIMETLA, V. S. R. N86-25087
GUNTER, W. D., JR. N86-24978
GURER, T. N86-25165
GURTIN, M. E. N86-25211
GUSHCHIN, V. S. N86-24812

H

HAAS, R. N86-25011
HACKBARTH, C. J. N86-25236
HAGER, B., H. N86-25069
HAHN, S. C. N86-25159
HAI, F. N86-24915
HALASE, J. F. N86-24760
HALBERT, R. C. N86-24926
HALE, T. W. N86-25038
HALL, H. E. N86-25148
HALL, J. R. N86-24752
HALL, S. R. N86-24678
HALSELL, J. D., JR. N86-24741
HAMINS, A. P. N86-24776
HAMM, R. M. N86-25119
HAMMOND, K. R. N86-25119
HANSEN, I. G. N86-24747
HANSON, B. H. N86-25096
HARDER, M. J. N86-24748
HARRIBEY, M. N86-24789
HARRINGTON, R. F. N86-24887
HARRIS, J. R. N86-25286
HARRIS, L. E. N86-24773
HARRIS, S. E. N86-24982
HARWIT, M. N86-24712
HASSELL, C. D. N86-24863
HASTIE, R. L., JR. N86-25026
HAUCK, W. S., III N86-25221
HAUG, E. J. N86-25025
HAUGLAND, E. J. N86-25267
HAUVER, S. N86-24970
HAVENS, S. J. N86-24840
HAWLEY, M. N86-24751
HAWMAN, M. W. N86-24766
HAYES, D. P. N86-24993
HAYES, J. M. N86-25116
HAZELL, M. S. N86-25240
HEDSTROM, J. C. N86-24954
HEGEMIER, G. A. N86-24764
HELM, P. J. N86-25099
HENDRY, R. M. N86-25102
HENRIQUEZ, T. A. N86-25222
HERBELL, T. P. N86-24839
HERBICH, J. B. N86-25105
HERBST, F. C. N86-25262
HERKERT, M. K. H. N86-25294
HERMES, T. N86-25237
HERRMANN, L. R. N86-24870
HERSHFELD, D. J. N86-25018
HERZOG, G. N86-25031
HEVNER, A. R. N86-25162
HEYLIGER, P. R. N86-25027
HICKS, R. S. N86-25234
HILL, C. L. N86-25032
HILLMAN, F. H. N86-24688
HIRABAYASHI, A. N86-25254
HOAD, D. R. N86-24665
HOAGLIN, D. C. N86-25153
HOEHNE, K. N86-25041
HOFFMAN, L. N86-25140
HOFFMAN, P. J. N86-25123
HOGAN, P. G. N86-25184
HOLLINGSWORTH, M. A. N86-25121
HOLMES, J. F. N86-25087
HOLTEN, J. R., III N86-24999
HOMMA, H. N86-24831
HOOKE, L. R. N86-25109
HOPKINS, D. A. N86-24756
N86-24757
HOPKINS, R. G. N86-25201
HORSTEIN, M. N86-24877
N86-24878
HORVATH, R. L. N86-24698
HOTCHKISS, S. A. N86-25131
HOTZ, R. B. N86-24726
HOUCK, J. A. N86-25168
HOUSTON, R. A. N86-24707
HRONOWSKI, L. J. J. N86-25114
HSU, J. N86-25306
HUANG, N. E. N86-25100
HUBBARD, H. H. N86-25215
HUFFMAN, S. N86-25163
HUFFORD, D. K. N86-25050
HUGHES, D. N86-25163
HULING, D. W. N86-24688
HUMPHREY, P. T. N86-24886
HUNSUCKER, R. D. N86-24903
HURLOCK, S. C. N86-24752
HWANG, D. P. N86-24658

I

ICHIMURA, M. N86-25249
INGEBO, R. D. N86-24961
IONIN, A. A. N86-24656
IRWIN, A. S. N86-24991
ISAKOV, S. A. N86-24809
ISHIDA, A. N86-25250
ISHII, K. N86-25259

J

JACOBS, I. S. N86-24925
JACOBSON, A. R. N86-25125
JACOBSON, N. S. N86-24813
JAEGER, D. L. N86-25161
JAMES, B. B. N86-24686
JAMES, J. H. N86-25022
JAMINET, J. F. N86-24766
JANOCKO, M. A. N86-25278
JANSKY, J. N86-25016
JARAMILLO, S. A. N86-25248
JARDIM, J. O. D. N86-25317

JASTAK, Z. N86-24885
JECK, R. K. N86-25079
JENKINS, R. V. N86-24662
JIANG, Y. N86-25177
JOHNSON, B. R. N86-25232
JOHNSON, C. B. N86-24700
JOHNSON, W. C. N86-24973
JOHNSTON, D. E. N86-24704
JOHNSTON, P. H. N86-25223
JONAS, J. N86-24785
JONAS, O. N86-24787
JONES, H. C. N86-24993
JONES, I. W. N86-24993
JONES, L. E. N86-24888
JONES, M. D. N86-25318
JONES, P. L. N86-25225
JONES, W. R. N86-24737
JONES, W. R., JR. N86-24835
JORDAN, H. N86-25067
JOUBERT, J. I. N86-25058
JUANG, J. N. N86-25019
JUHASZ, N. N86-24667
JULISCH, P. N86-25009

K

KABRERA, B. N86-24810
KAHN, W. N86-25030
KAKO, E. N86-25249
KALAFUS, R. M. N86-24690
KALIAKIN, V. N86-24870
KALISKI, M. E. N86-24996
KAMEL, N. N. N86-25141
KAMIS, A. N86-24882
KANDA, M. N86-24929
KANE, C. P. N86-25158
KARADENIZ, A. A. N86-24996
KARCHES, W. N86-24865
KARR, A. F. N86-25181
KARTOSHKIN, V. M. N86-24809
KATANO, Y. N86-24842
KATANUMA, I. N86-25259
KATSICOGIANNIS, A. D. N86-24901
KATZERMEIER, G. N86-25016
KAUFMANN, P. N86-25316
KAVANAUGH, C. N86-24729
KAZANTSEV, E. I. N86-24798
KEATING, H. N86-24846
KEATING, T. N86-25030
KEEFER, D. N86-24753
KEHOE, M. W. N86-24665
KELLER, E. E. N86-24738
KERBER, R. N86-24751
KERN, J. R. N86-25314
KERSHAW, J. N86-25276
KERSHAW, R. N86-25272
N86-25273
KHIZHNYAK, V. G. N86-24795
KIM, Y. S. N86-25247
KING, R. B. N86-24830
KING, R. M. N86-25155
KINSEY, J. L. N86-25231
KIRYANOV, Y. G. N86-24911
KISER, J. D. N86-24839
KIWAMOTO, Y. N86-25259
KLABUNDE, K. J. N86-25224
KLEIN, N. N86-24784
KLEVTSOV, A. G. N86-24656
KLINE, K. E. N86-24975
KNIGHT, J. C. N86-25142
KNOWLTON, S. N86-25263
KO, R. W. C. N86-25020
KOBAYASHI, H. S. N86-24879
KOGAN, V. N86-25067
KOHL, K. B. N86-24858
KOKORIN, N. A. N86-24799
KOLYADINA, E. V. N86-24754
KOO, Y. D. N86-25052
KOROLEV, G. V. N86-24911
KOROTKOV, V. A. N86-24802
KOSS, D. A. N86-24820
KOSUT, R. L. N86-24742
KOUYOUMJIAN, R. G. N86-24924
KOVAC, M. G. N86-25004
KREIDLER, E. R. N86-24850
KRISHNAIAH, P. R. N86-24927
KROEGER, C. N86-24769
KRUSE, T. N86-25031
KUDRIN, A. B. N86-24800
KUGA, H. K. N86-25202
KUKACKA, L. E. N86-24852
KULLERD, S. N86-24822
N86-24823
N86-24824
KULSRUD, R. M. N86-25255
KUNZE, E. L. N86-25108
KUO, F. Y. N86-24684
KUO, S. P. N86-25070
KUSHNIR, A. M. N86-24798
KUTSENOK, I. B. N86-24797
KUTYNA, D. J. N86-24726

L

LACASSE, M. N86-25148
LACKEY, J. G. N86-25036
LADERMAN, A. J. N86-24984
LAGRAFF, J. E. N86-24934
LAI, C. Y. N86-24882
LALA, G. G. N86-24930
LANGE, K. J. N86-24727
LARICHEVA, L. P. N86-24805
LARKIN, R. J. N86-24886
LARSON, L. E. N86-24721
LASLEY, M. L. N86-25122
LAUB, G. H. N86-24700
LAUE, H. N86-25009
LAW, P. H. N86-24677
LAWRANCE, A. J. N86-25185
LAWSON, R. E. N86-25077
LEDBETTER, F. E., III N86-24758
LEE, A. Y. N86-24851
LEE, C. N. N86-25245
LEE, J. T. N86-25077
LEE, K. S. N86-24988
LEE, S. H. N86-24900
LEPETRO, Y. N86-24831
LERCH, F. N86-25030
LERNER, R. M. N86-24920
LESS, M. C. N86-25147
LESTZ, S. J. N86-24847
LEVINE, R. D. N86-25231
LEVIUS, A. M. N86-24805
LEVREAULT, R. M. N86-25309
LEVY, D. M. N86-25290
LEWIS, P. A. W. N86-25185
LICHTENBERG, C. L. N86-24879
LIECK, K. N86-24769
LIM, H. S. N86-25046
LINASK, I. N86-25003
LINN, J. H. N86-25004
LIONS, P. L. N86-25189
LITOVSKII, V. V. N86-24806
LIU, C. R. N86-24871
LIU, J. T. C. N86-24932
LOBANOV, M. N. N86-24802
LOBANOV, V. V. N86-24806
LOCKHART, R. A. N86-25182
LOSKUTOV, V. F. N86-24795
LUDWIG, F. L. N86-25083
LUKENS, W. E. N86-24998
LURIA, S. M. N86-25125
LYAKHOVICH, L. S. N86-24809
LYNCH, N. A. N86-24716
LYNN, N. N86-24652
LYONS, M. G. N86-24742

M

MACHIKIN, V. I. N86-24792
MACKINNON, D. J. N86-25099
MAEDA, K. N86-24844
MAFFEO, R. N86-24931
MAGGS, J. E. N86-25073
MAHONEY, K. H. N86-25296
MAJKRZAK, C. F. N86-24831
MAKHANKOV, A. N. N86-24811
MALL, G. H. N86-24962
MALONE, T. P. N86-24995
MANDZY, J. N86-24952
MANHEIMER, W. M. N86-24985
MANN, M. R. N86-24893
MANOLOPOULOS, A. N86-25238
MANSBRIDGE, J. V. N86-25055
MANUEL, S. N86-25147
MAPLES, B. N86-25163
MARBACH, H. W., JR. N86-24847
MARCHAND, N. N86-24818
MARQUES, E. R. C. N86-25002
MASHIKO, S. K. N86-25152
N86-25156
MASKOWITZ, J. V. N86-25213
MASON, A. S. N86-25059
MATUS, L. G. N86-24959
N86-25267
MAUDGAL, S. N86-24841
MAULDIN, L. E., III N86-24744
MAUTZ, J. R. N86-24887
MAYER, L. S. N86-25120
MAZUR, D. G. N86-24891
MCALLISTER, J. G. N86-24746
MCCAULEY, C. K. N86-25099
MCCAULEY, J. F. N86-25099
MCCONNELL, W. P. N86-24918
MCCOOL, S. N86-25263
MCDERMOTT, S. N86-25263
MCKNIGHT, R. N86-24667
MCMILLEN, D. F. N86-24777
MCNAMARA, B. S. N86-25101
MCPHAIL, A. T. N86-25271
MCPHERRON, C. N86-24822
N86-24823
N86-24824
MCRUER, D. T. N86-24704
MEADOR, M. A. N86-24835
MEHTA, S. P. N86-24928
MERINOV, G. N. N86-25014
MERKEL, D. E. N86-24973
MERRILL, W. C. N86-24697
MEWALDT, R. A. N86-25017
MEYER, D. J. N86-25279
MEYER, T. G. N86-25003
MICKELSON, M. E. N86-24721
MIDDLETON, R. N86-25031
MIKKELSEN, K. N86-24667
MIKULAS, M. M., JR. N86-24867
MILDEN, M. J. N86-25051
MILLARD, M. L. N86-24836
MILLER, E. F. N86-24881
MILLER, J. N86-24883
MILLER, M. N86-24822
N86-24823
N86-24824
MILLER, S. G. N86-25198
MIRELS, H. N86-24979
MISRA, A. K. N86-24817
MISRA, M. S. N86-24762
MITCHELL, A. M. N86-24992
MIYAZONO, C. K. N86-25044
MIYOSHI, K. N86-24836
MIYOSHI, S. N86-25259
MJOLSNESS, R. C. N86-24953
MOBLEY, J. A. N86-25235
MOFFATT, D. L. N86-24882
N86-24924
MONTES, A. N86-25257
MONTGOMERY, E. T. N86-25103
MOONEY, F. W. N86-24683
MOORHEAD, A. J. N86-24846
MORALES, G. J. N86-25073
MORALES, W. N86-24835
MORAN, J. R. N86-24945
MOREHOUSE, K. A. N86-24934
MORGAN, J. N86-25031
MOROZ, V. I. N86-25315
MORREN, W. E. N86-24748
MORRESE, S. C. N86-24923
MORSE, H. A. N86-24700
MOSHKIN, B. Y. N86-25315
MOSS, C. E. N86-25126
MOSTELLER, F. N86-25153
MOTYKA, P. N86-24678
MUELLER, K. N86-24652
MUIR, H. C. N86-25286
MUKHACHEVA, A. V. N86-24803
MULLER, H. N86-24652
MULLER, R. A. N86-25031
MURAKAMI, H. N86-24764
MURAKAMI, K. N86-24815
MURDUCK, J. M. N86-24831
MURPHY, D. P. N86-24970
MURRAY, C. F. N86-25194
MYERS, G. N86-24938
MYERS, T. T. N86-24704

N

NAALSUND, L. U. N86-25112
NAEGELI, D. W. N86-24858
NAGY, K. N86-24729
NAKAGAWA, Y. G. N86-24815
NAKAHARA, S. N86-25104
NAKAMURA, Y. N86-25252
NAKAO, J. H. N86-25037
NAMBU, Y. N86-25254
NARAIN, A. N86-24943
NEAL, V. N86-24712
N86-24714
NEEPER, D. A. N86-24954
NERI, D. F. N86-25125
NETO, A. R. N86-25179
N86-25202
NETZER, A. S. N86-24890
NEUGENT, W. N86-25140

NEVINS, J. L. N86-24996
NEWELL, J. P. N86-25078
NEWMAN, E. H. N86-24924
NEWNHAM, R. E. N86-24855
NGUYEN, K. T. N86-25210
NICHOLS-BOHLIN, J. N86-25307
NICHOLS, J. D. N86-25034
NICHOLSON, T. J. N86-25236
NIETUBICZ, C. J. N86-24951
NIKOLAEV, V. A. N86-25014
NILSSON, W. B. N86-25230
NISSLEY, D. M. N86-25003
NIU, K. N86-25258
NIZIOL, T. N86-25139
NORMAN, D. O. N86-25171
NORRIS, P. P. N86-25003
NOVAK, M. T. N86-25128
NYRKO, V. A. N86-24804

O

OBENSCHAIN, S. P. N86-25262
OBRIEN, J. E. N86-24934
OBRIEN, O. N86-24822
N86-24823
N86-24824
OCASIO, F. N86-25208
OESTLUND, H. G. N86-25059
OGAWA, Y. N86-25249
OHBAWA, Y. N86-25260
OHTA, Y. N86-24815
OLOUGHTON, J. P. N86-25243
ONOPRIENKO, V. G. N86-24794
OREILLY, F. N86-25182
ORIE, N. M. N86-24665
ORR, R. D. N86-24929
ORVIS, W. J. N86-25160
OSTAPENKO, V. P. N86-24790
OSWALD, D. A. N86-25230
OSWALD, F. B. N86-24992
OTT, W. E. N86-24969

P

PAGANO, T. S. N86-25248
PAN, D. S. N86-25277
PANEK, R. J. N86-25307
PARISH, R. C. N86-24729
PARKER, M. A. N86-24976
PASCHEN, K. W. N86-24915
PATHAK, P. N. N86-24924
PAVAND, M. N86-24789
PAVLENKO, I. I. N86-25000
PEARMAN, J. L. N86-25038
PECHACEK, R. E. N86-24970
PELLOUX, R. M. N86-24818
PENN, B. G. N86-24758
PENNER, H. N86-24652
PEPPER, S. V. N86-25284
PERETYATKO, V. N. N86-24805
PERRY, N. N86-24865
PETERSON, G. A. N86-25234
PETERSONS, O. N86-24928
PETRUSHEVSKII, M. S. N86-25282
PETRUZELLI, J. D. N86-25127
PEYRAN, R. J. N86-24700
PHILIP, P. N86-25270
PIANKO, M. N86-24692
PICRAUX, S. T. N86-24819
PIEKUTOWSKI, A. J. N86-24966
PIERCE, J. L. N86-25145
PINNELL, W. R. N86-24689
PITT, C. G. N86-25271
PIZZIMENTI, G. N86-24772
PLETNEVA, E. D. N86-24806
PLUCHINO, A. B. N86-24894
PODOBEDOVA, N. V. N86-24790
POLHEMUS, W. L. N86-24683
POLUKHIN, P. I. N86-24800
POPPE, M. C., JR. N86-24683
PORKOLAB, M. N86-25263
PORTER, J. E., III N86-25193
POUCH, J. J. N86-25268
PRATHAP, G. N86-25180
PRATT, J. R. N86-24841
PRIDDY, K. L. N86-24922
PRINCE, T. A. N86-25017
PRIOR, A. M. N86-25023
PRUDNIKOVA, L. I. N86-24804
PUGH, C. E. N86-25029
PURDY, A. P. N86-25271
PURVES, L. R. N86-25018

Q

QUAN, V. N86-24752
QUAZI, A. H. N86-25221

R

RABINOVICH, A. V. N86-24790
RABINOVITCH, B. S. N86-25229
N86-25230
RADTKE, M. N86-25109
RALEIGH, M. N86-24970
RALL, L. B. N86-25187
RAMEY, W. J., JR. N86-24682
RANAUDO, R. N86-24667
RASURE, J. R. N86-25175
RAY, W. N86-24865
RAYBORN, G. H. N86-24963
READEY, D. W. N86-24850
REDDY, J. N. N86-25027
REGENIE, V. A. N86-24687
REMER, J. H. N86-24681
REUTER, W. G. N86-25028
REVYAKINA, O. K. N86-24807
REYNOLDS, J. N86-25031
REZNIKOV, Y. N. N86-25013
RHODEN, W. E. N86-25213
RHODES, E. S. N86-24973
RHODES, M. D. N86-24867
RICHARDS, M. A. N86-25069
RICHMOND, J. H. N86-24924
RIDE, S. K. N86-24726
RILEY, M. F. N86-24686
RIZZI, A. N86-25270
ROBERTSON, J. B. N86-24909
ROBINSON, D. N. N86-25310
ROBINSON, E. R. N86-25221
ROBINSON, M. C. N86-24671
ROBSON, R. R. N86-24906
RODYAKIN, V. E. N86-24910
ROGERS, W. H. N86-25124
ROGERS, W. P. N86-24726
ROHATGI, N. K. N86-25043
ROJAS, R. G. N86-24677
ROOKE, D. P. N86-25023
ROSEN, I. G. N86-25167
N86-25176
ROSENFELD, A. N86-25157
N86-25245
N86-25293
ROSHKO, A. N86-24940
ROSS, S. N86-24849
ROSSBACH, P. C. N86-24921
ROSTOVTSEV, A. N. N86-24805
ROWE, J. E. N86-25109
ROWE, J. F. N86-25297
ROWE, M. C. N86-25133
ROWE, N. C. N86-25199
ROY, A. K. N86-24873
ROZENDAAL, R. A. N86-24659
RUDMAN, T. J. N86-24746
RUMMEL, R. W. N86-24726
RUSSELL, D. A. N86-24779
RUSSELL, J. K. N86-24977
RUTHBERG, Z. G. N86-25140
RYSS, G. M. N86-25282

S

SAH, C. T. N86-24908
SAHU, J. N86-24951
SAKHIYEV, A. S. N86-24911
SAMET, H. N86-25293
SANDALOV, A. N. N86-24910
SANITER, J. N86-25237
SANTROCK, J. N86-25116
SANZOVO, C. G. N86-25304
SARMA, G. R. N86-24964
SASAO, M. N86-25252
SATO, K. N. N86-25252
SAUER, H. H. N86-24902
SAVAGE, M. N86-24990
SAWYER, W. A. N86-25110
SCALISE, E., JR. N86-25304
SCHANK, R. C. N86-25170
SCHAPERY, R. A. N86-24765
SCHIEDERMAIER, J. N86-25010
SCHLEGEL, P. R. N86-25196
SCHLIESING, J. A. N86-24729
SCHLINKER, R. H. N86-25216
N86-25219
SCHMIDT, F. N86-25237
SCHMITT, R. N86-25016
SCHNABEL, R. B. N86-25154
SCHNEIDER, W. C. N86-24729
SCHOENBERG, I. J. N86-25186
N86-25191
SCHOTT, T. B. N86-25086
SCHOTT, T. D. N86-24960
SCHULLER, F. T. N86-24992
SCHULLER, I. K. N86-24831
SCHULTZ, G. A. N86-25154
SCHWARZ, S. E. N86-24916
SCHWEIGER, A. N86-25078
SCHWEIKHARD, W. G. N86-24933
N86-24955
SCOTT, G. R. N86-25244
SEASHOLTZ, R. G. N86-24967
SECCHI, P. N86-24942
SEEGMILLER, H. L. B. N86-24935
SEGALL, B. N86-25267
SELBY, G. V. N86-24661
SEMMEL, M. L. N86-24758
SERAFIM, P. N86-24986
SERFLING, R. J. N86-25181
SESHADRI, K. N86-24776
SETHURAMAN, J. N86-25006
SEWARD, W. A. N86-24782
SHALTENS, R. K. N86-25303
SHAPIRO, N. Z. N86-25148
SHATTUCK, J. N86-25163
SHAVRIN, O. I. N86-24799
SHAW, J. M. N86-25321
SHEAR, R. E. N86-25196
SHEEHAN, K. A. N86-24706
SHELDON, B. E. N86-25266
SHEN, C. K. N86-24870
SHEN, H. S. N86-25272
N86-25273
SHEPHERD, K. P. N86-25215
SHIBATA, C. S. N86-25257
SHIH, M. L. N86-24989
SHIPMAN, M. N86-25077
SHIRLEY, J. A. N86-24957
SHIRYAEV, V. T. N86-24794
SHISH, Y. I. N86-24791
SHMOYS, J. N86-25070
SHORES, P. W. N86-24879
SHOUCRI, M. N86-25073
SHTYKHNO, A. P. N86-24810
SIDNER, C. L. N86-25172
SIDOROV, V. E. N86-24812
SIMONEAU, R. J. N86-24934
SIMONICH, J. C. N86-25218
N86-25219
SIMONS, R. N. N86-24907
SIMONTON, J. W. N86-24667
SIMPSON, G. R. N86-24896
SINGH, J. J. N86-24962
SKAKOV, Y. A. N86-24801
SKORKHODOV, A. N. N86-25012
SLADE, S. N86-25170
SLEEP, N. H. N86-25069
SLINEY, H. E. N86-24837
SMIRNOV, A. N. N86-24792
SMIRNOV, L. A. N86-24803
SMITH, H. C. N86-24690
SMITH, J. O. N86-24895
SMITH, P. D. N86-24729
SMITH, S. L. N86-25294
SNAGOVSKII, L. M. N86-24796
SOBIESZCZANSKI-SOBIESKI, J. N86-24686
SOBOLEV, V. I. N86-24656
SOMERS, P. W. N86-25313
SOURS, J. O. N86-25205
SOUTH, W. K. N86-24760
SOVEY, J. S. N86-24748
SPINELLO, A. G. N86-25037
SPIVAK, A. V. N86-24793
SPJELDVIK, W. N. N86-24902
SPRANGLE, P. N86-24986
SPRAY, L. A. N86-25084
SRINIVASAN, A. V. N86-24693
SRINIVASAN, R. N86-24938
ST.CLAIR, T. L. N86-24841
STAINBACK, P. C. N86-24709
STAMPER, J. A. N86-25262
STAROV, V. Y. N86-24656
STEBBINS, F. J. N86-24729
STECH, D. J. N86-24983
STEELE, F. K. N86-24902
STEINFELD, G. N86-25049
STEPHENS, M. A. N86-25182
STEPIEN, T. M. N86-24996
STETTBACHER, A. N86-24868
STEVENS, K. B. N86-25239
STOFFER, L. J. N86-24760
STOKER, D. P. N86-25233
STOKES, W. R. N86-25038

STONE, E. C. N86-25017
STONE, G. L. N86-25077
STONE, J. R. N86-24749
STONEBACK, V. W. N86-24746
STOPPLER, W. N86-25010
STOUT, J. P. N86-25068
STRADER, E. A. N86-24720
N86-24966
STRADTMUELLER, W. N86-25009
STRANG, R. F. N86-25018
STRAW, A. D. N86-25024
STUART, M. N86-24705
STURM, D. N86-25009
N86-25010
N86-25011
SUBRAMANIAN, G. N86-25180
SUGAMA, T. N86-24852
SUIT, W. T. N86-24703
SUMMERS, C. J. N86-24905
SUMMERS, R. L. N86-24959
SUNDBERG, G. R. N86-24747
SUTTER, J. F. N86-24726
SVIDOROV, M. G. N86-24808
SWANSON, G. A. N86-25003
SWARTZ, W. E. N86-25004
SYDORA, R. D. N86-25214
SZODRUCH, J. N86-24710

T

TAFF, L. G. N86-25312
TAI, A. M. N86-25241
TAKASE, Y. N86-25263
TALVACCHIO, J. N86-25278
TANAKA, K. N86-24838
TANG, C. M. N86-24986
TARAN, Y. N. N86-24796
TARBELL, S. A. N86-25103
TARCZYNSKI, G. C. N86-25152
N86-25156
TAYLOR, K. N86-25132
TAYLOR, M. S. N86-25196
TAYLOR, P. N86-25030
TAYLOR, R. I. N86-25280
TEETER, R. N86-25109
TERASHIMA, H. N86-24815
TERENTIEV, A. F. N86-24795
TERLECKYJ, N. E. N86-25290
TETSUKA, T. N86-25261
TEXTER, S. N86-25263
THACKER, T. H. N86-24670
THALLER, L. H. N86-25039
THOMSON, W. P. N86-24892
TIAN, D. N86-24859
TIMONIN, V. M. N86-25014
TIMOTHY, J. G. N86-24965
TIMS, A. C. N86-25222
TINNEY, L. R. N86-25036
TIRPAK, J. D. N86-24821
TOLLAR, E. S. N86-25204
TOLSTIKOV, V. N. N86-24807
TOLSTOV, I. A. N86-24802
TONDA, R. D. N86-24765
TOUBOUL, M. N86-24770
TOWNES, C. H. N86-25242
TRAPP, D. A. N86-24889
TREES, S. V. N86-25163
TREFNY, C. J. N86-24694
TRESSLER, R. E. N86-24855
TROGLER, W. C. N86-24775
TRUBIN, V. N. N86-25015
TRUONG, K. Q. N86-24863
TSAI, T. T. N86-24853
TUCKER, L. N86-24912

U

UHM, H. S. N86-25210
ULANOVSKII, Y. B. N86-24801
UNNAM, J. N86-24814
URAMOTO, J. N86-25253
URBAN, E. W. N86-25305

V

VADELUND, E. A. N86-24872
VAMPOLA, A. L. N86-25072
VANDERLINDEN, H. H. N86-24994
VASTILEV, E. Y. N86-24796
VAZ, A. M. Z. N86-25316
VEDRENNE, G. N86-25317
VENEZKY, D. L. N86-25298
VENUGOPAL, R. N86-24871
VEREMEEVICH, A. N. N86-24793
VERGOS, C. D. N86-25135
VERZWYVELT, S. A. N86-25046
VIETRI, M. N86-25308
VIG, J. R. N86-24919
VILASBOAS, J. W. S. N86-25304
VOLKOV, L. G. N86-24791
VONKARMAN, T. N86-24940
VORNOV, G. V. N86-24804
VUKOVICH, F. M. N86-25060

W

WADEHRA, J. M. N86-25228
WAGNER, E. N86-24678
WAGNER, R. I. N86-24752
WAKATANI, M. N86-25252
WALBORN, N. R. N86-25307
WALKER, K. P. N86-25003
WALKER, R. A. N86-25129
WALKER, S. L. N86-24899
WALL, A. N86-25270
WALLACE, J. S. N86-24854
WALLIN, J. W. N86-25136
WALRATH, D. E. N86-24755
WALTON, E. K. N86-24882
WANG, T. C. N86-24936
WANG, W. N86-25177
WANG, Y. N86-24860
WANGE, G. N86-24652
WARNER, J. D. N86-25268
WARNESS, R. N86-24834
WARREN, J. B. N86-24852
WARREN, J. R. N86-25034
WASH, C. H. N86-25082
N86-25084
WASSERBAUER, J. W. N86-24894
WATARI, T. N86-25249
WATSON, T. J. N86-24829
WAZELT, F. N86-24692
WEATHERBY, J. R. N86-24765
WEBER, M. W. N86-25134
WEDERTZ, J. A. N86-25295
WEERTMAN, J. R. N86-24827
WEINBERG, F. J. N86-24784
WEINSTEIN, L. M. N86-24673
WEIR, D. S. N86-25220
WEISS, I. N86-24826
WEITSMAN, Y. N86-24767
WELCH, C. S. N86-25001
WELLS, A. L. N86-25212
WELLS, G. M. N86-25057
WELLS, M. E. N86-24998
WELLS, R. L. N86-25271
WESSELSKI, C. J. N86-24729
WEST, C. L. N86-25240
WHALEN, M. V. N86-24748
WHEELER, D. R. N86-25284
WHITCOMBE, D. W. N86-25281
WHITE, C. N86-24938
WHITE, H. J. N86-24787
WHITE, W. R. N86-25226
WHITE, W. T. N86-24758
WHITLOW, W., JR. N86-24663
WIEDEMANN, J. N86-25009
WIESE, M. R. N86-24660
WILLIAMS, J. G. N86-25222
WILLIAMS, J. H., JR. N86-25002
WILLIAMS, L. D. N86-24946
WILLIAMS, M. H. N86-24663
WILLIAMS, R. S. N86-24766
WILLIFORD, C. F. N86-25149
WINEBARGER, R. M. N86-24672
WINNER, W. A. N86-25206
WISSLER, J. B. N86-24949
WITT, D. J. N86-25151
WOLD, A. N86-25272
N86-25273
N86-25276
WOOD, F. R. N86-25118
WOOL, R. P. N86-24856
WORLEY, R. A. N86-24725
WU, A. Y. N86-25157
WU, C. F. J. N86-25188
WYRTKI, K. N86-25104

X

XIA, N. N86-24668

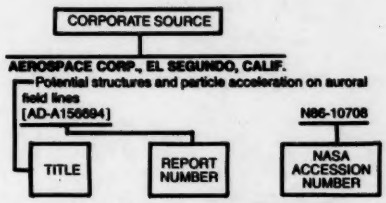
Y

YAMAGIWA, M. N86-25251
YAMAMOTO, T. N86-25209
YAMAZAKI, H. N86-25105
YANG, D. N86-24825
YANG, Z. N86-24715
YAO, G. Q. N86-25272
N86-25273
YAO, S. B. N86-25162
YAROSHENKO, M. V. N86-25014
YATES, G. J. N86-25248
YEH, C. N86-24914
YEH, J. R. N86-24768
YERASI, M. N86-25007
YERSHOVA, T. I. N86-24843
YIN, X. N86-24668
YODER, G. R. N86-24829
YOON, S. N86-24655
YOON, S. C. N86-24864
YOSHIZAWA, H. N86-24815
YOUNG, J. F. N86-24982
YOUNG, M. J. N86-25262
YUAN, X. N86-24887

Z

ZABARAS, G. J. N86-24956
ZAKHARCHENKO, K. V. N86-24797
ZAMLUTTI, C. J. N86-25178
ZBORSHCHIK, A. M. N86-24792
ZEFELD, V. V. N86-24736
ZELT, F. B. N86-24974
ZHANG, W. N86-24859
ZHAO, L. C. N86-24927
ZHURAVLEV, A. Z. N86-25013
ZIPH, B. N86-25302
ZIRN, R. N86-25011
ZORIN, E. G. N86-24804
ZORUMSKI, W. E. N86-25220
ZOUTENDYK, J. A. N86-25269
ZVONAREVA, N. P. N86-24808
ZYDA, M. J. N86-25129
N86-25184

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The NASA accession number denotes the number by which the citation is identified. The titles are arranged under each corporate source in ascending accession number order.

A

ADMINISTRATIVE SCIENCES CORP., ALEXANDRIA, VA.
A survey of O and S (Operating and Support) cost models
[AD-A163438] N86-25287

ADMIRALTY RESEARCH ESTABLISHMENT, PORTLAND (ENGLAND).
FORTRAN program for vibration and sound radiation of spherical shell
[AD-A163752] N86-25022

ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT, NEUILLY-SUR-SEINE (FRANCE).
Propulsion and Energetics Panel Working Group 14 on suitable averaging techniques in non-uniform internal flows
[AD-A133968] N86-24692
Technical evaluation report on the ElectromagneticWave Propagation Panel Symposium on Propagation Effects on Military Systems in the High Latitude Region
[AGARD-AR-218] N86-24903
Fatigue rated fastener systems
[AGARD-R-721] N86-24994
AGARD Bulletin: Meetings, publications, membership
[AGARD-BULL-86/1] N86-25285

AEROJET ELECTROSYSTEMS CO., AZUSA, CALIF.
Schottky barrier surface science
[AD-A163574] N86-25275

AEROSPACE CORP., EL SEGUNDO, CALIF.
Adhesion and the surface behavior of the silicone elastomer
[AD-A163815] N86-24851
A comprehensive model of the photophoretic force on a spherical microparticle
[AD-A163022] N86-24894
Partial-discharge tests of multiwinding high-voltage transformers for space TWTAs (Traveling-Wave Tube Amplifiers)
[AD-A163882] N86-24915
Reverse-wave suppressor mirror effects on CW HF unstable ring laser performance
[AD-A163529] N86-24979
Nickel hydrogen battery cell testing data base: An industry and government survey
[AD-A163017] N86-25051
Plasma observations in the auroral and polar cap region
[AD-A163654] N86-25071
Electron precipitation patterns in the vicinity of a VLF transmitter
[AD-A163716] N86-25072

AEROSPACE CORP., LOS ANGELES, CALIF.
A quantum mechanical investigation of vibrational energy transfer in O ((3)P) + H sub 2 O collisions
[AD-A164159] N86-25232

AIR FORCE ACADEMY, COLO.
Behavioral considerations for space station design
[AD-A163478] N86-25118

AIR FORCE ACCOUNTING AND FINANCE CENTER, DENVER, COLO.
Strategic missile (Minuteman) operating and support cost factors
[AD-A163534] N86-24723

AIR FORCE INST. OF TECH., WRIGHT-PATTERSON AFB, OHIO.
Use of state estimation to calculate angle-of-attack position error from flight test data
[AD-A163962] N86-24670
Gyro and accelerometer based navigation system for a mobile autonomous robot
[AD-A164036] N86-24682
Experimental assessment of vortex retaining cavity flaps for maneuverability improvement on delta wing fighter aircraft
[AD-A164104] N86-24690
Two-dimensional confined jet thrust vector control with flow visualization and variable flow geometry
[AD-A164214] N86-24699
Experimental study of apex fences for lift enhancement on a highly swept delta wing configuration
[AD-A163877] N86-24705
Multivariable control law design for enhanced air combat maneuvering. F-15/STOL (Short Take-Off and Landing) derivative fighter
[AD-A164017] N86-24706
An LQG up-and away flight control design for the STOL F-15 aircraft
[AD-A164108] N86-24707
LQG/LTR design of a robust flight controller for the STOL F-15
[AD-A164111] N86-24708
The detumbling of an axially symmetric satellite with an orbital maneuvering vehicle by nonlinear feedback control
[AD-A163989] N86-24717
Stability of spinning ICBM (intercontinental ballistic missile) in first stage boost phase
[AD-A164019] N86-24724
Estimation of ICBM (intercontinental ballistic missile) performance parameters
[AD-A164021] N86-24725
Unsteady solution of the boundary layer equations with application to space shuttle tiles
[AD-A164105] N86-24727
Control of a large space structure using direct output feedback and modal suppression
[AD-A163960] N86-24738
The effect of energy dissipation due to friction at the joint of a simple beam structure
[AD-A163975] N86-24739
Moving-bank multiple model adaptive algorithms applied to flexible spacecraft control
[AD-A164016] N86-24740
A proposed design for an interim space rescue ferry vehicle
[AD-A164039] N86-24741
The determination of the natural frequencies and mode shapes for anisotropic laminated plates including the effects of shear deformation and rotatory inertia
[AD-A164040] N86-24763
High resolution coherent anti-Stokes Raman spectroscopy of deuterium gas
[AD-A163946] N86-24779
A model for oxygen atom recombination on a silicon dioxide surface
[AD-A163990] N86-24782
Algorithm definition for the VLSI design implementation of the electromagnetic radiation integral
[AD-A163825] N86-24888
Physical optics model of side lobe nulling by discs on a parabolic reflector
[AD-A163826] N86-24889
Characteristics of Bayesian multiple model adaptive estimation for tracking airborne targets
[AD-A163830] N86-24890
Design methodology of an automated scattering measurement facility
[AD-A163896] N86-24891
Airborne bistatic radar limitations and sample calculations
[AD-A163941] N86-24892
Comparison of background characteristics of an RCS (Radar Cross Section) measurement range using a CW-Nulling technique and a pulse-gating technique
[AD-A163965] N86-24896
Real-time flight test PCM data acquisition monitor
[AD-A164035] N86-24897
Simulation of chaff cloud signature
[AD-A164106] N86-24898
Analysis of integrated and nonintegrated voice and data networks for DoD communications
[AD-A164176] N86-24899
Arithmetic circuitry for high speed VLSI Winograd Fourier transform processor
[AD-A163943] N86-24917
Control circuitry for high speed VLSI (Very Large Scale Integration) winograd fourier transform processors
[AD-A164043] N86-24921
Study and analysis of AlGaAs/GaA modulation doped field-effect transistors incorporating p-type Schottky gate barriers
[AD-A164103] N86-24922
A microcomputer-based menu-driven chip layout language
[AD-A164109] N86-24923
Kalman filter design for the long range intercept function of the F-4E/G fire control system
[AD-A164205] N86-24926
An experimental study of clustered nozzles with variable shrouds
[AD-A163961] N86-24945
Effects of surface roughness on pressure distribution and boundary layer over compressor blades at high Reynolds number in a two-dimensional cascade
[AD-A163974] N86-24946
Flat plate and turbine vane cascade heat transfer investigation using a shock tube
[AD-A163992] N86-24947
Adaptive-grid optimization for minimizing steady-state, truncation error
[AD-A164038] N86-24948
A schlieren and hot-wire investigation of karman vortex streets
[AD-A164101] N86-24949
Design of a digital controller for an ultragravimetric microbalance
[AD-A164014] N86-24971
Optical feedback stabilization of laser diodes for passive resonance ring laser gyro applications
[AD-A163942] N86-24983
Automating knowledge acquisition in a flightline robot
[AD-A163829] N86-24997
A robot vision system
[AD-A164202] N86-24999
Verification of a Monte Carlo simulation method to find lower confidence limits for the availability and reliability of maintained systems
[AD-A163832] N86-25005
Robust estimation of the location parameter of life distributions
[AD-A163993] N86-25008
The buckling of composite cylindrical panels considering environmental effects
[AD-A163878] N86-25024
Predicting the effects of overloads on sustained-load crack growth in a high-temperature superalloy
[AD-A164018] N86-25026
Development of a run time math library for the 1750A airborne microcomputer
[AD-A163905] N86-25131
Architecture and numerical accuracy of high-speed DFT (Discrete Fourier Transform) processing systems
[AD-A163963] N86-25132

Content-Addressable Memory manager: Design and evaluation
[AD-A164037] N86-25133
Development and implementation of the x.25 protocol for the universal network interface device (UNID) 2. Volume 2
[AD-A164042] N86-25134
Comparison of absorption and radiation boundary conditions using a time-domain three-dimensional finite difference electromagnetic computer code
[AD-A163828] N86-25149
Computer assisted instruction for the C programming language on the Zenith Z-100 microcomputer system AFIT/GCS/MA/85D-2 HC A11/MF A01
[AD-A163842] N86-25150
Using Ada in the real-time avionics environment Issues and conclusions
[AD-A163844] N86-25151
Development of a computer aided design package for control system design and analysis for a personal computer (ICECAP-PC), volume 1
[AD-A163940] N86-25152
Development of a computer aided design package for control system design and analysis for a personal computer (ICECAP-PC). Volume 2
[AD-A164044] N86-25156
Computer model of a passive synthetic aperture imaging system
[AD-A164144] N86-25158
Development of a Digital Interactive Controller Evaluation System (DICES)
[AD-A163966] N86-25164
Reasoning in real-time for the pilot associate: An examination of a model based approach to reasoning in real-time for artificial intelligence systems using a distributed architecture
[AD-A163947] N86-25171
Study of the effects of discretizing quantitative feedback theory analog control system designs
[AD-A164209] N86-25174
A comparison of estimation techniques for the three parameter Pareto distribution
[AD-A163831] N86-25192
Modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises tests for the Pareto distribution with unknown location and scale parameters
[AD-A163837] N86-25193
A new method for computing the generalized inverses of a matrix and its application to the Lyapunov matrix equation
[AD-A163840] N86-25194
Solutions of nonlinear matrix equations
[AD-A163841] N86-25195
Numerical grid generation for parabolic partial differential equations using marching techniques
[AD-A164020] N86-25198
Preliminary kalman filter design to improve air combat maneuvering target estimation for the F-4E/G fire control system
[AD-A164034] N86-25200
A comparison of estimation techniques for the two parameter Cauchy distribution
[AD-A163833] N86-25205
A modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-von Mises test for the Cauchy distribution with unknown location and scale parameters
[AD-A164204] N86-25208
Quantum theory of ion motion and laser cooling in a radio frequency quadrupole trap
[AD-A163838] N86-25212
Electron microscopy observation of electrotransport
[AD-A164107] N86-25213
Quantum mechanical atomic energy operator
[AD-A163839] N86-25226
Numerical solutions of selected problems which arise in the theory of particle beams
[AD-A164041] N86-25235
Pseudo-color display of laser radar imagery
[AD-A164213] N86-25246
Design and implementation of a centralized data directory for a distributed database management system
[AD-A163843] N86-25295
The design and implementation of a relational to network query translator for a distributed database management system
[AD-A164013] N86-25296
A network monitoring facility for a distributed data base management system
[AD-A164129] N86-25297
An analysis of the accessibility of Earth-approaching asteroids
[AD-A163976] N86-25313

AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AFB, OHIO.
Our wings A01
[AD-A163608] N86-24654
Investigation of rolling-up and interaction of leading-edge and trailing-edge vortex sheets on a slender delta wing
[AD-A163692] N86-24668
Overview of space technology
[AD-A163887] N86-24715
Relying on progress of technology, to develop our alloy steel
[AD-A163690] N86-24825
Calculated research on the energetic characteristic of TN in composite solid propellant
[AD-A163691] N86-24859
Non-destructive laser holographic testing of solid propellant for unbonding defects
[AD-A163694] N86-24860
ACTA Armamentarii (selected articles)
[AD-A163713] N86-24861
Circuits and exchange parameters at the C2 interface in the case of sequential input-output of discrete information
[AD-A163688] N86-24884
Electromagnetic pulse: The fifth factor in the impact of a nuclear explosion
[AD-A163695] N86-24885
A method for fabricating magnetodielectric cores
[AD-A163457] N86-24911
Unified matrices for electronic computers
[AD-A163689] N86-25130

AIR FORCE WEAPONS LAB., KIRTLAND AFB, N. MEX.
An ultraviolet laser shadowgraphy system for the SHIVA-STAR fast capacitor bank
[AD-A163867] N86-24968

AIR FORCE WRIGHT AERONAUTICAL LABS., WRIGHT-PATTERSON AFB, OHIO.
Constant-Load-Amplitude fatigue crack growth testing of cast aluminum alloys A201-T7 and A357-T6
[AD-A163494] N86-24821

AKRON UNIV., OHIO.
System life and reliability modeling for helicopter transmissions
[NASA-CR-3967] N86-24990
Effects of state recovery on creep buckling under variable loading
[NASA-CR-175094] N86-25310

ALLIED BENDIX AEROSPACE, TETERBORO, N.J.
Evaluation of a double Gimbal IPACS design
[NASA-CR-178040] N86-24745

APPLIED SCIENCE ASSOCIATES, INC., APEX, N.C.
Studies related to ocean dynamics. Task 3.2: Aircraft Field Test Program to investigate the ability of remote sensing methods to measure current/wind-wave interactions
[NASA-CR-168349] N86-25100

ARGONNE NATIONAL LAB., ILL.
Structural study of multilayered vanadium/nickel superlattices
[DE85-018396] N86-24831

ARKANSAS UNIV., FAYETTEVILLE.
Chaos in laser-matter interactions N86-24989

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, DOVER, N. J.
CARS (Coherent Anti-Stokes Raman Scattering) spectroscopy of the reaction zone of methane-nitrous oxide and RDX propellant flames
[AD-A163465] N86-24773

ARMY AVIATION SYSTEMS COMMAND, ST. LOUIS, MO.
VHF-FM communications antennas for project SINCGARS (UH-1 tail whip and cabin roof bent whip evaluation)
[AD-A163561] N86-24883
Cost estimating relationships for fixed wing aircraft: List price versus empty weight
[AD-A164196] N86-25300

ARMY ELECTRONICS RESEARCH AND DEVELOPMENT COMMAND, WHITE SANDS MISSILE RANGE, N. MEX.
The behavior of cloud droplets in an acoustic field: A numerical investigation
[AD-A163704] N86-25081

ARMY MILITARY PERSONNEL CENTER, ALEXANDRIA, VA.
Controlling nonpoint pollution in Virginia's urbanizing areas: An institutional perspective
[AD-A163693] N86-25057

ARMY RESEARCH INST. OF ENVIRONMENTAL MEDICINE, NATICK, MASS.
Research animal stanchion and transporter
[AD-A163907] N86-25110

ASEA ELECTRIC, INC., WAUKESHA, WIS.
Calibration of test systems for measuring power losses of transformers
[PB86-132032] N86-24928

B

BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
Measurement of interior ballistic performance using FM/FM radio telemetry techniques
[AD-A164150] N86-24728
Convective heating of energetic materials
[AD-A163919] N86-24778
Competing unimolecular reactions of flame radicals. Part 1: Isomerization and dissociation of the methoxy radical
[AD-A164154] N86-24783
Radical fluorescence studies with liquid propellants
[AD-A163472] N86-24857
Numerical flow field calculations for a missile configuration at M = .6
[AD-A164155] N86-24951
A fuzzy set approach to vulnerability analysis AD-A163921 BRL-TR-2697 HC A03/MF A01
[AD-A163921] N86-25196
Introduction to kernel density estimation
[AD-A163920] N86-25206

BATTELLE COLUMBUS LABS., OHIO.
Aerosol behavior modeling. Task 3: Support services for research and evaluation of severe accident phenomena and mitigation
[TI86-900242] N86-25067

BEECH AIRCRAFT CORP., WICHITA, KANS.
Evaluation of propfan propulsion applied to general aviation
[NASA-CR-175020] N86-24695

BIONETICS CORP., HAMPTON, VA.
Prediction of the far field noise from wind energy farms
[NASA-CR-177956] N86-25215

BOEING COMMERCIAL AIRPLANE CO., SEATTLE, WASH.
Natural laminar flow flight experiments on a swept wing business jet-boundary layer stability analyses
[NASA-CR-3975] N86-24659

BOEING MILITARY AIRPLANE DEVELOPMENT, SEATTLE, WASH.
Fireproof hydraulic brake system
[AD-A163542] N86-24688

BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
The structures of discourse structure
[AD-A163024] N86-25172

BRITISH BROADCASTING CORP., KINGSWOOD (ENGLAND).
Colour encoding and decoding techniques for line-locked sampled PAL and NTSC television signals
[BBC-RD-1986/2] N86-24874
Experiments with digitally mastered LaserVision optical discs
[BBC-RD-1986/1] N86-24976

BRITISH LIBRARY LENDING DIV., BOSTON SPA (ENGLAND).
Aerodynamic characteristics of gas cushion for cylinders
[BLL-M-36671-(5828.4)] N86-24656
Damping properties os granule-based composite materials
[BLL-M-36692-(5828.4)] N86-24754
Reasons for low plasticity of steel of Type 25-20
[BLL-36604-SER-M-5828.4] N86-24790
Using REM oxides to modify steel
[BLL-M-36639-(5828.4)] N86-24791
Silicon distribution in synthetic cast iron
[BLL-M-36689-(5828.4)] N86-24792
Effectiveness of laser treatment of materials by scanning beam
[BLL-M-36690-(5828.4)] N86-24793
Properties of 14Kh17N2 steel in corrosive environment
[BLL-M-36691-(5828.4)] N86-24794
Deposition of chromium carbides on steel in atmosphere of carbon tetrachloride
[BLL-M-36693-(5828.4)] N86-24795
Melting of solid solution during crystallization of alloy white cast iron
[BLL-M-36677-(5828.4)] N86-24796
The thermodynamic particulars of amorphous cobalt alloys
[BLLD-5828.4-M-36658] N86-24797
Mathematical model of temperature conditions of cooling of metal during plastic deformation
[BLLD-5828.4-M-36663] N86-24798
Method of producing a three-dimensional coordinate grid
[BLLD-5828.4-M-36664] N86-24799
Compacting kinetics of metal powders during pressing
[BLLD-5828.4-M-36666] N86-24800

The heat treatment of Ti-Al-V system alloy foil produced by vacuum precipitation
[BLLD-5828.4-M-36666] N86-24801
Heat treatment of tool joints for drill pipes
[BLLD-5828.4-M-36669] N86-24802
Influence of lime additions on silicothermic reduction of titanium
[BLLD-5828.4-M-36638] N86-24803
Degree to which natural gas is dissociated during thermal oxidation pyrolysis
[BLL-M-36630-(5828.4)] N86-24804
Influence of parameters of microstructure on process of hot deformation of two-phase steel
[BLL-M-36626-(5828.4)] N86-24805
Enthalpies of mixing of alkaline-earth metals with iron and nickel
[BLLD-5828.4-M-36625] N86-24806
Thermokinetic diagram of embrittlement of maraging steel 03N18K9M5T-VD
[BLLD-5828.4-M-36648] N86-24807
Influence of oxidation on coefficient of hydrogen diffusion in meraging steels
[BLL-M-36647-(5828.4)] N86-24808
Influence on wear of translational velocity of specimens during laser borizing of steel
[BLL-M-36646-(5828.4)] N86-24809
Influence of annealing temperature on ductile properties of steel wire
[BLL-M-36645-(5828.4)] N86-24810
Study of phase distribution in unstable austenite steel using thermoelectromotive forces
[BLL-M-36644-(5828.4)] N86-24811
Magnetic susceptibility of Fe-Cr-O alloys
[BLL-M-36643-(5828.4)] N86-24812
Question of application of method of finite elements to problems of deformation of incompressible media
[BLLD-5828.4-M-36665] N86-25012
Computerized upper-boundary-value solutions of problems in mechanical working of metals
[BLL-M-36627-(5828.4)] N86-25013
Determination of main strength properties of 9KhF roll steel
[BLL-M-36651-(5828.4)] N86-25014
Determination of stress state from strain state
[BLL-M-36642-(5828.4)] N86-25015
Crack growth on a PWR-RPV nozzle corner under cyclic thermal shock load
[BLL-RISLEY-TR-5284-(9091.9F)] N86-25016
Enthalpies of formation of liquid three-component iron-cerium-aluminium alloys
[BLL-M-36623-(5828.4)] N86-25282

BROOKHAVEN NATIONAL LAB., UPTON, N. Y.
Physico-chemical factors affecting hydrothermal resistance and bonding of polymeric composites to steel surfaces
[AD-A163906] N86-24852

BROWN UNIV., PROVIDENCE, R. I.
Contributions to the understanding of large-scale coherent structures in developing free turbulent shear flows
[NASA-CR-176772] N86-24932
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163537] N86-25272
Preparation and characterization of ZnSiP2 and ZnGeP2 single crystals
[AD-A163559] N86-25273
The photoelectrochemical properties of MoS sub2 single crystals grown in the presence of cobalt
[AD-A163592] N86-25276

C

CAIRO UNIV., GIZA (EGYPT).
The influence of a hot particle component on plasma stability
[IPPJ-755] N86-25256

CALIFORNIA DEPT. OF TRANSPORTATION, SACRAMENTO.
Low-solvent primer and finish coats for use on steel structures
[PB86-139326] N86-24834

CALIFORNIA INST. OF TECH., PASADENA.
Structure and mixing in turbulent shear flows
[AD-A163584] N86-24940
Research in particles and fields
[NASA-CR-176763] N86-25017
Dynamically supported geoid highs over hotspots: Observation and theory
[NASA-CR-176766] N86-25069

CALIFORNIA UNIV., BERKELEY.
Research on devices for integrated millimeter wave systems
[AD-A163903] N86-24916
Far infrared heterodyne detection with gallium doped germanium photoconductors
[AD-A163879] N86-25242
Superconducting quantum devices, summary and conclusions
[DE86-001978] N86-25283

CALIFORNIA UNIV., BERKELEY. LAWRENCE BERKELEY LAB.
Accurate sturcture factor determination of binary cubic solid solutions
[DE86-002891] N86-24832
Search for right-handed currents by means of muon spin rotation
[DE86-002870] N86-25233

CALIFORNIA UNIV., DAVIS.
Improved numerical implementation of the bounding surface plasticity model for cohesive soils
[AD-A163572] N86-24870

CALIFORNIA UNIV., IRVINE.
Multidisciplinary studies on excitatory amino acids as transmitters in the brain
[AD-A164258] N86-25115

CALIFORNIA UNIV., LOS ANGELES.
Stress-strain behavior and failure uniaxial composites in combined compression and shear-2
[AD-A163477] N86-25020
Modification of the ionospheric electron velocity distribution function due to resonant absorption of HF waves
[AD-A163025] N86-25073
Shifting the closed-loop spectrum in the optimal linear quadratic regulator problem for hereditary systems
[NASA-CR-178082] N86-25167
An application of adaptive learning to malfunction recovery
[NASA-CR-166620] N86-25169
Numerical approximation for the infinite-dimensional discrete-time optimal linear-quadratic regulator problem
[NASA-CR-178081] N86-25176
Theoretical investigation of point defects of mercury cadmium telluride A01
[AD-A163735] N86-25277

CALIFORNIA UNIV., SAN DIEGO, LA JOLLA.
A mixture model for unidirectionally fiber-reinforced composites
[AD-A164136] N86-24784
Catalysis of hydrolysis reactions by platinum and nickel phosphine complexes
[AD-A163666] N86-24775
Mechaniams of combustion of hydrocarbon/alcohol fuel blends
[AD-A163737] N86-24776

CALIFORNIA UNIV., SANTA CRUZ.
Physical oceanographic data marginal ice zone experiment R/V POLAR QUEEN, June-July 1984
[AD-A163591] N86-25101

CASE WESTERN RESERVE UNIV., CLEVELAND, OHIO.
Corrosion of nickel and cobalt base alloys in sulfate melts at 750 deg C
[NASA-CR-175111] N86-24817

CENTRE D'ESSAIS AERONAUTIQUE TOULOUSE (FRANCE).
PES (plasticizer) levels of a BSL 914 resin (CEAT C76 reference) from different standards
[PB86-120854] N86-24789

CHEMICAL RESEARCH AND DEVELOPMENT CENTER, ABERDEEN PROVING GROUND, MD.
A dimensional analysis approach for characterizing pryotechnic mixture systems
[AD-A163018] N86-24983

CLEMSON UNIV., S.C.
B and V photoelectric photometry and light curve solution of the interacting binary systems HI Puppis,BI Eridani and Sy Horologii N86-25314

COLLEGE OF WILLIAM AND MARY, WILLIAMSBURG, VA.
Quantitative non-destructive testing
[NASA-CR-176761] N86-25001

COLORADO STATE UNIV., FORT COLLINS.
Forecast of Atlantic seasonal hurricane activity for 1986 N86-25080

COLORADO UNIV., BOULDER.
The development of vorticity and vortices from forced unsteady flow separation N86-24671
Microlens system formed on the end of a single mode fiber for laser applications N86-24988
Empirical and modeled synoptic cloud climatology of the Arctic Ocean
[NASA-CR-176752] N86-25078
A diagnostic analysis of the Pyrenees lee wave event of 21-23 March 1982 N86-25098
Generalizing over conditions by combining the multitrait multimethod matrix and the representative design of experiments
[AD-A163685] N86-25119
The use of controlled redundancy in self-adaptive databases N86-25141
A trust region algorithm for nonlinearly constrained optimization
[AD-A163986] N86-25154

COMMERCE DEPT., WASHINGTON, D.C.
Evaluating R and D and new product development ventures: An overview of assessment methods $12.00/MF A01
[PB86-110806] N86-25289

COMMITTEE ON SCIENCE AND TECHNOLOGY (U. S. HOUSE).
Science policy study. Volume 7: International cooperation in science
[GPO-52-283] N86-25301

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION, MORDIALOC (AUSTRALIA).
Description of a two-dimensional atmospheric transport model
[DAR-TP-11] N86-25055

COMPUTER SCIENCES CORP., HAMPTON, VA.
USSAERO version D computer program development using ANSI standard FORTRAN 77 and DI-3000 graphics
[NASA-CR-3980] N86-24660

COOPERS AND LYBRAND, WASHINGTON, D.C.
Evaluating R and D and new product development ventures: An overview of assessment methods $12.00/MF A01
[PB86-110806] N86-25289

CORNELL UNIV., ITHACA, N.Y.
The design and construction of a magnetic bearing
[AD-A163552] N86-24995

CRANFIELD INST. OF TECH., BEDFORD (ENGLAND).
The behaviour and performance of leading edge vortex flaps
[CAR-8601] N86-24666
Pressure based separation in the upper airspace
[CAR-8614] N86-24679
Leadership on the flight deck: The influence of crew social relations and crew member experience on leadership style effectiveness in civil aviation flight crews
[CAR-8612] N86-25266

D

DAYTON UNIV., OHIO.
Laser-photodetector timing station instruction and maintenance manual
[NASA-CR-178835] N86-24720
Hall station and camera system operation and maintenance manual
[NASA-CR-178836] N86-24966

DEFENCE AND CIVIL INST. OF ENVIRONMENTAL MEDICINE, DOWNSVIEW (ONTARIO).
A review of the pilot backache problem in the CH113 Labrador helicopter
[AD-A164011] N86-25113

DENISON UNIV., GRANVILLE, OHIO.
Radiometric calibration procedures using the NBS (National Bureau of Standards) MARBLE electronics package
[PB86-129756] N86-24721

DEPARTMENT OF ENERGY, WASHINGTON, D. C.
Removal of sulfur and nitrogen containing pollutants from discharge gases
[DE85-017799] N86-25058

DEPARTMENT OF THE AIR FORCE, WASHINGTON, D.C.
Frameless transparencies for aircraft cockpit enclosures
[AD-D012155] N86-24689
One-piece HPTR blade squealer tip
[AD-D012003] N86-24698
Non-perturbing beam deflection system and method for high repetition rate temperature measurement of combustion flames
[AD-D012154] N86-24780
Method to reveal microstructures in single phase alloys
[AD-D012020] N86-24826
Method for making heterocyclic block copolymer
[AD-D011971] N86-24853
Protected ethyniated phenols
[AD-D012019] N86-24854
Interactive communication channel
[AD-D011968] N86-24893
Orientation of circular connectors using vision processing
[AD-D012153] N86-24918
Method of making a resonator having a desired frequency from a quartz crystal resonator plate
[AD-D012157] N86-24919

Dual mode heat exchanger
[AD-D012156] N86-24944
Total temperature probe buffer amplifier
[AD-D011967] N86-24969
Laser beam duct pressure controller system
[AD-D012017] N86-24984
VMJ solar cell fabrication process using mask aligner
[AD-D011966] N86-25050
High efficiency pulse ultraviolet light source
[AD-D011965] N86-25243

DRAPER (CHARLES STARK) LAB., INC., CAMBRIDGE, MASS.
The evaluation of the OSGLR algorithm for restructurable controls
[NASA-CR-178083] N86-24678
Adaptive control, learning, and cost-effective sensor systems for robotics or advanced automation systems
[AD-A163615] N86-24996

DREXEL UNIV., PHILADELPHIA, PA.
Positron annihilation studies of very fine structured materials
[AD-A163822] N86-25225

DUKE UNIV., DURHAM, N. C.
Molecular absorption of atmospheric species
[AD-A164024] N86-25075
Isolation and characterization of an organogallium-arsenic cluster: Crystal structure of ((PhAsH)(R2Ga)(PhAs)6(RGa)4)(R=Me3SiCH2)
[AD-A163485] N86-25271

E

ECOSYSTEMS INTERNATIONAL, INC., GAMBRILLS, MD.
A definition study of an Advanced Data Collection and Location System (ADCLS)
[NASA-CR-177867] N86-25291

EDGERTON, GERMESHAUSEN AND GRIER, INC., IDAHO FALLS, IDAHO.
Dynamic moire interferometry in mechanics research
[DE86-004128] N86-25028

EG AND G ENERGY MEASUREMENTS, INC., LAS VEGAS, NEV.
Comprehensive integrated remote sensing for US Department of Energy applications
[DE86-002101] N86-25036

EMTEC ENGINEERING, INC., LOS ANGELES, CALIF.
Configuration study of new low-loss MM (Millimeter) wave guiding structures
[AD-A163784] N86-24914

ENERGY RESEARCH CORP., DANBURY, CONN.
Development of 3 and 5 kW fuel cell power plants
[AD-A163603] N86-25047
Development of partial oxidizer/reformer for PAFC power plants
[AD-A163781] N86-25049

ENVIRONMENTAL PROTECTION AGENCY, RESEARCH TRIANGLE PARK, N.C.
Emissions from a light-duty diesel: Ambient temperature and fuel effects
[PB86-131349] N86-24865
Atmospheric modeling: Model and accuracy
[PB86-128683] N86-25062

ENVIRONMENTAL RESEARCH INST. OF MICHIGAN, ANN ARBOR.
Parallel image transmission through a single optical fiber
[AD-A163809] N86-25241

ESSEX CORP., HUNTSVILLE, ALA.
The great observatories for space astrophysics
[NASA-CR-176754] N86-24712
The design, fabrication and delivery of a manipulator foot restraint mockup for space telescope development testing
[NASA-CR-178837] N86-25121

F

FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C.
Evaluating turbine engine operating characteristics
[FAA-AC-25.939-1] N86-24896

FEDERAL AVIATION AGENCY, ATLANTIC CITY, N.J.
Computed centerline MLS (Microwave Landing System) approach demonstration at Washington National Airport
[AD-A163722] N86-24681

FEDERAL COMMUNICATIONS COMMISSION, WASHINGTON, D. C.
Evaluating compliance with FCC (Federal Communications Commission) specified guidelines for human exposure to radiofrequency radiation
[PB86-127081] N86-25117

FLORIDA STATE DEPT. OF TRANSPORTATION, GAINESVILLE.
Aerial camera research: Accuracy comparison using the ZEISS RMK 15/23 and the JENA LMK aerial cameras
[PB86-126836] N86-24973

FLORIDA STATE DEPT. OF TRANSPORTATION, TALLAHASSEE.
Aerial camera research: Accuracy comparison using the ZEISS RMK 15/23 and the JENA LMK aerial cameras
[PB86-126836] N86-24973

FLORIDA STATE UNIV., TALLAHASSEE.
Failure times in maintenance models
[AD-A163891] N86-25006
A test for program effect in the absence of a proper control group
[AD-A163783] N86-25204

FLORIDA UNIV., GAINESVILLE.
A characterization of the chemical vapor deposition of gallium arsenide and indium phosphide in the hydride and chloride systems
[AD-A164259] N86-25279

G

GARRETT TURBINE ENGINE CO., PHOENIX, ARIZ.
Dilution jet mixing program, phase 3
[NASA-CR-174884] N86-24938

GENERAL ACCOUNTING OFFICE, WASHINGTON, D. C.
Weather satellite costs have increased, problems have occurred in their manufacturing quality control
[PB86-131398] N86-24743
NASA's FIA (National Aeronautics and Space Administration's Financial Integrity Act) Program: NASA's progress in implementing Financial Integrity Act requirements
[PB86-135100] N86-25288

GENERAL ELECTRIC CO., CINCINNATI, OHIO.
Evaluation of capillary reinforced composites
[NASA-CR-175061] N86-24780
Burner liner thermal/structural load modeling: TRANCITS program user's manual
[NASA-CR-174891] N86-24931

GENERAL ELECTRIC CO., PITTSFIELD, MASS.
Technical notes on orifice tests
[AD-A164227] N86-24952

GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
Advanced artificial dielectric materials for millimeter wavelength applications. Part A
[AD-A164195] N86-24925

GEOLOGICAL SURVEY, DORAVILLE, GA.
Water resources data for Georgia, water year 1984
[PB86-127016] N86-25038

GEOLOGICAL SURVEY, RESTON, VA.
A strategy for adoption of accelerator mass spectrometry by the Earth sciences
[TI85-901777] N86-25031
Remote monitoring of processes that shape desert surfaces: The Desert Winds Project
[TI86-900108] N86-25099

GEOLOGICAL SURVEY, SYOSSET, N. Y.
Water resources data for New York, water year 1984. Volume 2: Long Island
[PB86-137338] N86-25037

GEORGE MASON UNIV., FAIRFAX, VA.
Trends in industrial R and D activities in the United States, Europe and Japan, 1963-83
[PB86-141371] N86-25290

GEORGETOWN UNIV., WASHINGTON, D.C.
A research program in active control/aeroelasticity
[NASA-CR-176773] N86-24702
Technology assessment: Methods for measuring the level of computer security
[PB86-129954] N86-25140

GEORGIA INST. OF TECH., ATLANTA.
Theoretical and material studies on thin-film electroluminescent devices
[NASA-CR-176710] N86-24905
Technology for satellite power conversion
[NASA-CR-176777] N86-25042

GEORGIA STATE UNIV., ATLANTA.
Fungi and hydrocarbons in the marine environment
[PB86-109964] N86-25066

GEORGIA UNIV., ATHENS.
Metal cluster topology. Part 3: Platinum carbonyl clusters
[AD-A164241] N86-24830

H

HARVARD UNIV., CAMBRIDGE, MASS.
Robust/resistant techniques of data analysis
[AD-A163972] N86-25153

HAWAII INST. OF GEOPHYSICS, HONOLULU.
Monthly maps of sea level anomalies in the Pacific, 1975 1981. Report on the IGOSS (Integrated Global Ocean Services System) Sea Level Pilot Project
[AD-A163061] N86-25104

HOUSTON UNIV., TEX.
Studies of vertical annular gas-liquid flows
N86-24956

HUGHES AIRCRAFT CO., FULLERTON, CALIF.
RADC (Rome Air Development Center) nonelectronic reliability notebook. Revision B
[AD-A163900] N86-25007

HUGHES RESEARCH LABS., MALIBU, CALIF.
Long life nickel electrodes for a nickel-hydrogen cell: Cycle life tests
[NASA-CR-174815] N86-25046

HUGHES RESEARCH LABS., TORRANCE, CALIF.
Designing a 25-kilowatt high frequency series resonant
[NASA-CR-176774] N86-24906

I

IBM RESEARCH LAB., SAN JOSE, CALIF.
Properties of organic superconductors
[AD-A163573] N86-25274

ILLINOIS UNIV., URBANA.
Transport and relaxation processes in supercritical fluids
[DE86-002921] N86-24785
Non-linear optical techniques for visible and UV lasers and thin film deposition
[AD-A164188] N86-24828
Crack healing in polymers
[AD-A164130] N86-24856
Laser probing and modification of MOCVD and VPE reactor kinetics
[AD-A163860] N86-24981
Nonlinear earthquake analysis of concrete building structures
[AD-A163517] N86-25021

IMPERIAL COLL. OF SCIENCE AND TECHNOLOGY, LONDON (ENGLAND).
Optical studies of electrical discharge-liquid propellant interactions
[AD-A164156] N86-24784

INDIANA UNIV., BLOOMINGTON.
Isotopic study of the inhalation toxicology of oxidants
[PB86-109485] N86-25116

INSTITUTO DE PESQUISAS ESPACIAIS, SAO JOSE DOS CAMPOS (BRAZIL).
A theory for classified quantities
[INPE-3788-PRE/883] N86-25178
State estimation procedure based upon the duality concept
[INPE-3796-PRE/891] N86-25179
Kalman filtering state noise adaptive estimation
[INPE-3790-PRE/885] N86-25202
Graphical study of electromagnetic wave accessibility in tokamak plasmas near the electron-cyclotron frequency
[INPE-3810-PRE/896] N86-25257
Is G305.8-0.2 a young object?
[INPE-3787-PRE/882] N86-25304
Gamma-ray background induced in a double Ge(Li) spectrometer at balloon altitudes in the hemisphere
[INPE-3797-PRE/892] N86-25317

INTEGRATED SYSTEMS, INC., PALO ALTO, CALIF.
Adaptive control techniques for large space structures
[AD-A164240] N86-24742

INTEGRATED SYSTEMS ANALYSTS, INC., NATIONAL CITY, CALIF.
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 1. Sections 1 to 8
[AD-A163670] N86-24822
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 2: Appendices A3, A4, A6, A8
[AD-A163671] N86-24823
Corrosion-Control (CC) program SIMA (Shore Intermediate Maintenance Activity) pilot CC (Corrosion-Control) shop service test and technical support. Volume 3: Appendix A7
[AD-A163672] N86-24824

INTERIOR DEPT., WASHINGTON, D.C.
Improved detector for the measurement of gamma radiation
[PB86-106945] N86-24974

IOWA UNIV., IOWA CITY.
Dynamic and design sensitivity analysis of rigid and elastic mechanical systems with intermittent motion
[AD-A163982] N86-25025

A plasma wave instrument on the AMPTE/IRM (Active Magnetospheric Particle Tracing Explorers/Ion Release Module) spacecraft
[AD-A163048] N86-25074

IRWIN (ARTHUR S.) CO., INC., BEMUS POINT, N.Y.
Review and critical analysis: Rolling-element bearings for system life and reliability
[NASA-CR-174710] N86-24991

J

JACKSON STATE UNIV., MISS.
Diagnostic study of atmosphere-terrain interaction leading to the formation of dust clouds and poor visibilities over the near east desert areas
[AD-A163890] N86-25085

JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.
Conceptual design study: Forest Fire Advanced System Technology (FFAST)
[JPL-PUBL-86-5] N86-25034
Silicon production in a fluidized bed reactor
[JPL-PUBL-86-17] N86-25043
Overview of software development at the parabolic dish test site
[JPL-PUBL-85-56] N86-25044
Environmental tests of metallization systems for terrestrial photovoltaic cells
[JPL-PUBL-85-86] N86-25045

JOHN CARROLL UNIV., CLEVELAND, OHIO.
Time domain referencing in intensity modulation fiber optic sensing systems
[NASA-CR-175109] N86-24691

JOHNS HOPKINS UNIV., BALTIMORE, MD.
Poisson approximation of Bernoulli point processes and their superpositions, via coupling
[AD-A163442] N86-25181

K

KANSAS STATE UNIV., MANHATTAN.
Real-time adaptive control of a robotic manipulator using three-dimensional stereoscopic vision feedback
N86-25175
Introduction to free atoms and particles
[AD-A163586] N86-25224

KANSAS UNIV. CENTER FOR RESEARCH, INC., LAWRENCE.
Statistical prediction of dynamic distortion of inlet flow using minimum dynamic measurement. An application to the Melick statistical method and inlet flow dynamic distortion prediction without RMS measurements
[NASA-CR-176764] N86-24933
Review and evaluation of recent developments in melic inlet dynamic flow distortion prediction and computer program documentation and user's manual estimating maximum instantaneous inlet flow distortion from steady-state total pressure measurements with full, limited, or no dynamic data
[NASA-CR-176765] N86-24955

KENTRON INTERNATIONAL, INC., HAMPTON, VA.
Structural optimization by generalized, multilevel decomposition
[NASA-TM-87605] N86-24686

KESTREL INST., PALO ALTO, CALIF.
Knowledge-based transformational synthesis of efficient structures for concurrent computation
[AD-A164022] N86-25155

L

LAWRENCE LIVERMORE NATIONAL LAB., CALIF.
POSSOL: Poisson equation solver
[DE86-002292] N86-25160

LICK OBSERVATORY, SANTA CRUZ, CALIF.
Metallicity and the level of the ultraviolet rising branch in elliptical galaxies
[NASA-CR-176670] N86-25311

LOCKHEED MISSILES AND SPACE CO., HUNTSVILLE, ALA.
Feasibility study and verified design concept for new improved hot gas facility
[NASA-CR-178828] N86-24719

LOS ALAMOS NATIONAL LAB., N. MEX.
Vorticity production in delayed asymmetric cylindrical implosions
[DE86-004369] N86-24953
Vapor phase heat transport systems
[DE86-004360] N86-24954
Stratospheric tritium sampling
[DE86-004368] N86-25059
Monte Carlo simulation of two-particle relative diffusion using Eulerian statistics: Extended abstract
[PB86-116548] N86-25077
Examination of the Circle Spline routine
[DE86-004361] N86-25161
Shuttering efficiencies of nanosecond-gated photoemissive shutter tubes
[DE85-015728] N86-25248

LOS ALAMOS SCIENTIFIC LAB., N. MEX.
Chemical, petrographic and K-Ar age data to accompany reconnaissance geologic strip map from Kingman to South of Bill Williams Mountain, Arizona
[DE85-014242] N86-25035

M

M/A-COM LINKABIT, INC., VIENNA, VA.
DSCS network performance software support. Revision
[AD-A163530] N86-25163

MANAGEMENT AND TECHNICAL SERVICES CO., WASHINGTON, D.C.
USSR Space Life Sciences Digest, issue 5
[NASA-CR-3922(05)] N86-25109

MARINE ENVIRONMENTAL SCIENCES CONSORTIUM, DAUPHIN ISLAND, ALA.
The ecology of irregularly flooded salt marshes of the northeastern Gulf of Mexico: A community profile
[TI86-900237] N86-25068

MARTIN MARIETTA AEROSPACE, DENVER, COLO.
Advanced orbit transfer vehicle propulsion system study
[NASA-CR-174843] N86-24746
Damping characteristics of metal matrix composites
[AD-A163569] N86-24762
Satellite voice broadcast. Volume 1: Executive summary
[NASA-CR-175016] N86-24875
Satellite voice broadcast. Volume 2: System study
[NASA-CR-175017] N86-24876

MARYLAND UNIV., COLLEGE PARK.
Parallel processing of region boundaries
[AD-A164112] N86-25157
Continuous representations of digital images
[AD-A164189] N86-25245
Application of hierarchical data structures to geographical information systems
[AD-A163674] N86-25293

MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
Distributed FIFO allocation of identical resources using small shared space
[AD-A163988] N86-24716
Generalized parity relations for large space structures with uncertain parameters
[NASA-CR-176762] N86-24730
Thermal-mechanical fatigue behavior of nickel-base superalloys
[NASA-CR-175048] N86-24818
Stress waves in transversely isotropic media: The homogeneous problem
[NASA-CR-3977] N86-25002
Energy and chemical change
[AD-A164147] N86-25231
Energy confinement studies of lower hybrid current driven discharges in the Alcator C tokamak
[DE85-014754] N86-25263
The analysis of near-Earth satellite astrometric data at the ETS
[AD-A163902] N86-25312

MASSACHUSETTS INST. OF TECH., LEXINGTON.
Low pass filters with linear phase
[AD-A163984] N86-24920

MASSACHUSETTS UNIV., AMHERST.
Connecting mathematics, science and high technology: Research on solutions to nonlinear partial differential equations, bifurcation phenomena, and constructive methods for implementing the calculus of variations for relevant, physical problems
[AD-A162827] N86-25197
Nuclear structure studies by the scattering of medium-energy electrons
[DE86-002265] N86-25234

MICHIGAN STATE UNIV., EAST LANSING.
Generation of free radicals and ions for spacecraft propulsion
[NASA-CR-176672] N86-24751

MICHIGAN TECHNOLOGICAL UNIV., HOUGHTON.
Advanced processing and properties of high performance alloys
[AD-A163469] N86-24820

MINNESOTA UNIV., MINNEAPOLIS.
Wave attenuation in periodic structures N86-24873
Climate sensitivity of a numerical model of ice-sheet dynamics and thermodynamics
[PB86-119617] N86-25096
Overlayer-induced enhanced oxidation of GaAs surfaces
[AD-A163450] N86-25270

N

NAGOYA UNIV. (JAPAN).
Advanced ICRF antenna design for R-TOKAMAK
[IPPJ-759] N86-25249
Kink stability of long ion layers
[IPPJ-758] N86-25250
Tail anisotropy instability during plasma current rise by lower-hybrid waves in a tokamak
[IPPJ-756] N86-25251
Active diagnostics of magnetically confined alpha particles by pellet injection
[IPPJ-757] N86-25252
Volume produced H(-), D(-) ion source for proton accelerator and thermo-nuclear fusion research by sheet plasma (1)
[IPPJ-760] N86-25253
Excitation anisotropy in laser-induced-fluorescence spectroscopy: Broad-line excitation case
[IPPJ-761] N86-25254
Lectures on topics in magnetic reconnection and transport in fusion devices
[IPPJ-762] N86-25255
The influence of a hot particle component on plasma stability
[IPPJ-755] N86-25256
Proceedings of Topical Meeting on Particle Beam Fusion and its Related Problems, volume 1
[IPPJ-769-VOL-1] N86-25258
Thermal barrier potential of a tandem mirror
[IPPJ-768] N86-25259
A solidary wave of a relativistic magnetosonic wave propagating perpendicularly to a magnetic field
[IPPJ-767] N86-25260
Measurement of density fluctuations on the JIPP T-II tokamak plasma by millimeter and sub-millimeter wave scattering
[IPPJ-766] N86-25261

NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
Earth science investigations in the United States Antarctic Research Program (USARP) for the period July 1, 1984 - June 30, 1985
[PB86-143773] N86-25076
Los Angeles, California tornado of March 1, 1983
[PB86-141991] N86-25089

NATIONAL AERONAUTICAL LAB., BANGALORE (INDIA).
Mechanics of field-consistency in finite element analysis: A penalty function approach
[NAL-TM-ST-8514] N86-25180

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D.C.
Selections from Flug Revue und Flugwelt International. A. On the border of Time-hypersonic flight. B. NASA programs pave the way for the hypersonic aircraft. C. Shuttle flight 61-B; construction in space. D. Faster than a bullet; hypersonic military aircraft
[NASA-TM-88418] N86-24652
Aeronautical Engineering: A continuing bibliography with indexes (supplement 199)
[NASA-SP-7037(199)] N86-24653
Eigenstructure assignment and its application in design of flight control systems
[NASA-TM-88411] N86-24701
Wind tunnel technology for the development of future commercial aircraft
[NASA-TM-88390] N86-24710
Space Station Systems: A bibliography with indexes (supplement 1)
[NASA-SP-7056(01)] N86-24711
Technology for large space systems: A bibliography with indexes
[NASA-SP-7046(13)] N86-24713
Spacecraft architecture
[NASA-TM-77908] N86-24736
Conductimetric determination of decomposition of silicate melts
[NASA-TM-88394] N86-24769
The thallium monoborate-boric acid anhydride binary system
[NASA-TM-88393] N86-24770
Anisotropy of high temperature strength in precipitation-hardened nickel-base superalloy single crystals
[NASA-TM-88387] N86-24815
Contribution to the study of the electric arc: Erosion of metallic electrodes
[NASA-TM-77855] N86-24816
Manufacture of ceramic sinters
[NASA-TM-88398] N86-24842
Interparticle interference during light scattering by submicroinhomogeneous glass
[NASA-TM-88407] N86-24843

Binders for compacting nitride type ceramics
[NASA-TM-88397] N86-24844
The long-range shelling of Paris and physical chemistry problems of extremely long-range firing
[NASA-TM-88416] N86-24868
Microwave tube collectors. Collector systems of UHF devices with longitudinal interactions
[NASA-TM-88399] N86-24910
An experimental investigation on location of boundary layer transition on the NACA 0012 using surface hot film gages
[NASA-TM-88285] N86-24936
Structural design and kinematic configuration of two-armed robots
[NASA-TM-88419] N86-25000
Earth resources: A continuing bibliography with indexes (issue 49)
[NASA-SP-7041(49)] N86-25033
Process for producing an electrode membrane unit for hydrogen/bromine cells
[NASA-TM-88396] N86-25041
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 284)
[NASA-SP-7011(284)] N86-25111
Data analysis on the rotor test stand program for interactive processing
[NASA-TM-77948] N86-25146
Optimal quadratic asymptotic design approach and its applications
[NASA-TM-88389] N86-25177
Optical star coupler with large number of inputs and outputs
[NASA-TM-88395] N86-25237
Preliminary results of the Vega 1 and Vega 2 optical investigation of aerosol in the atmosphere of Venus at 30-60 KM
[NASA-TM-88414] N86-25315

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
Swashplate control system
[NASA-CASE-ARC-11633-1] N86-24700
Liquid seeding atomizer
[NASA-CASE-ARC-11631-1] N86-24935
Dual mode laser velocimeter
[NASA-CASE-ARC-11634-1] N86-24978

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. DRYDEN (HUGH L.) FLIGHT RESEARCH CENTER, EDWARDS, CALIF.
An engineering approach to the use of expert systems technology in avionics applications
[NASA-TM-88263] N86-24687
Combining and connecting linear, multi-input, multi-output subsystem models
[NASA-TM-85912] N86-25166

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
Renewing solar science: The solar maximum repair mission
[NASA-EP-206] N86-24714
Statistical correlation analysis for comparing vibration data from test and analysis
[NASA-TM-86081] N86-25018
Geopotential research mission science, engineering and program summary
[NASA-TM-86240] N86-25030
International Ultraviolet Explorer Atlas of O-typespectra from 1200 to 1900 angstrom
[NASA-RP-1155] N86-25307
The possible importance of synchrotron/inverse Compton losses to explain fast MM-wave and hard X-ray emission of a solar event
[NASA-TM-88659] N86-25316
Research and technology, fiscal year 1985
[NASA-TM-88753] N86-25320

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. JOHN F. KENNEDY SPACE CENTER, COCOA BEACH, FLA.
Physical, anthropometrical, and body composition characteristics of workers at Kennedy Space Center
[NASA-TM-83102] N86-25122

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.
Method and apparatus for measuring distance
[NASA-CASE-MSC-20912-1] N86-24879
Laser ranging and video display system
[NASA-CASE-MSC-20870-1] N86-24977

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
Unsteady transonic flow calculations for wing-fuselage configurations
[NASA-TM-87707] N86-24657
R4 airfoil data corrected for sidewall boundary-layer effects in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TP-2565] N86-24662
Nonisentropic unsteady three dimensional small disturbance potential theory
[NASA-TM-87726] N86-24663
Rotor performance characteristics from an aeroacoustic helicopter wind-tunnel test program
[NASA-TM-87661] N86-24665
Loads and motions of an F-106B flying through thunderstorms
[NASA-TM-87671] N86-24672
Ice detector
[NASA-CASE-LAR-13403-1] N86-24673
Ground vibration test of an F-16 airplane with modified decoupler pylons
[NASA-TM-87634] N86-24685
Structural optimization by generalized, multilevel decomposition
[NASA-TM-87605] N86-24686
Lateral and longitudinal aerodynamic stability and control parameters of the basic vortex flap research aircraft as determined from flight test data
[NASA-TM-87711] N86-24703
Dynamic measurement of total temperature, pressure and velocity in the Langley 0.3-meter transonic cryogenic tunnel
[NASA-TP-2584] N86-24709
Structural performance of space station trusses with missing members
[NASA-TM-87715] N86-24731
A computer modeling methodology and tool for assessing design concepts for the Space Station Data Management System
[NASA-TM-87647] N86-24737
Halogen occultation experiment intergrated test plan
[NASA-TM-87709] N86-24744
Diffusion oxygen barrier coating A02/MF A01
[NASA-CASE-LAR-13474-1-SB] N86-24814
Process for crosslinking methylene-containing aromatic polymers with ionizing radiation
[NASA-CASE-LAR-13448-1] N86-24840
Poly(carbonate-mide) polymer
[NASA-CASE-LAR-13292-1] N86-24841
Deployable geodesic truss structure A01
[NASA-CASE-LAR-13113-1] N86-24867
Measurement apparation and procedure for the determination of surface emissivities
[NASA-CASE-LAR-13455-1] N86-24880
Flat-panel, full-color electroluminescent display
[NASA-CASE-LAR-13407-1] N86-24909
Inductive energy for rapid strain guage attachment
[NASA-CASE-LAR-13237-1] N86-24960
Measurement of viscosity of gaseous mixtures at atmospheric pressure
[NASA-TP-2582] N86-24962
Adjustable mount for electro-optic transducers in an evacuated cryogenic system
[NASA-CASE-LAR-13100-1] N86-24993
Mathematical correlation of modal parameter identification methods via system realization theory
[NASA-TM-87720] N86-25019
Shifting the closed-loop spectrum in the optimal linear quadratic regulator problem for hereditary systems
[NASA-CR-178082] N86-25167
Theoretical three-and four-axis gimbal robot wrists
[NASA-TP-2564] N86-25168
Numerical approximation for the infinite-dimensional discrete-time optimal linear-quadratic regulator problem
[NASA-CR-178081] N86-25176
Aircraft Noise Prediction Program theoretical manual: Propeller aerodynamics and noise
[NASA-TM-83199] N86-25220
Braille reading system
[NASA-CASE-LAR-13306-1] N86-25292

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.
A numerical analysis applied to high angle of attack three-dimensional inlets
[NASA-TM-87298] N86-24658
In-flight measurements of wing ice shapes and wing section drag increases caused by natural icing conditions
[NASA-TM-87301] N86-24667
Low-speed performance of an axisymmetric, mixed-compression, supersonic inlet with auxiliary inlets
[NASA-TP-2557] N86-24694
A real-time simulation evaluation of an advanced detection, isolation and accommodation algorithm for sensor failures in turbine engines
[NASA-TM-87289] N86-24697
Passive eddy-current damping as a means of vibration control in cryogenic turbomachinery
[NASA-TP-2562] N86-24722
Space station 20-kHz power management and distribution system
[NASA-TM-87314] N86-24747
Performance and endurance tests of a multipropellant resistojet for space station auxiliary propulsion
[NASA-TM-87278] N86-24748
NASA electrothermal auxiliary propulsion technology
[NASA-TM-87281] N86-24749
Thermoviscoplastic nonlinear constitutive relationships for structural analysis of high temperature metal matrix composites
[NASA-TM-87291] N86-24756
A unique set of micromechanics equations for high temperature metal matrix composites
[NASA-TM-87154] N86-24757
Simplified composite micromechanics for predicting microstresses
[NASA-TM-87295] N86-24759
Application of an atmospheric pressure sampling mass spectrometer to chlorination reactions
[NASA-TM-87270] N86-24813
A preliminary study of ester oxidation on an aluminum surface using chemiluminescence
[NASA-TM-87242] N86-24835
Improved consolidation of silicon carbide
[NASA-TM-87243] N86-24836
Adequacy of surface analytical tools for studying the tribology of ceramics
[NASA-TM-87308] N86-24837
Abrasion and deformed layer formation of manganese-zinc ferrite in sliding contact with lapping tapes
[NASA-TM-87249] N86-24838
Particle size reduction of Si3N4 with Si3N4 milling hardware
[NASA-TM-86864-REV] N86-24839
Criteria for significance of simultaneous presence of both condensible vapors and aerosol particles on mass transfer (deposition) rates
[NASA-TM-87247] N86-24869
Impact of the 1985 Space World Administrative Radio Conference on frequency/orbit planning and use
[NASA-TM-87285] N86-24881
Analysis of optically controlled microwave/millimeter wave device structures
[NASA-TM-87246] N86-24907
Unsteady heat transfer and direct comparison to steady-state measurements in a rotor-wake experiment
[NASA-TM-87220] N86-24934
Beam-modulation methods in quantitative and flow visualization holographic interferometry
[NASA-TM-87306] N86-24958
Apparatus for electrical measurements of thin films from 77 to 1000 K
[NASA-TM-87256] N86-24959
Characterization of simulated small-droplet fuel sprays
[NASA-TM-87286] N86-24961
Ramp-integration technique for capacitance-type blade-tip clearance measurement
[NASA-TM-87241] N86-24964
Combined fringe and Fabry-Perot laser anemometer for three component velocity measurements in turbine stator cascade facility
[NASA-TM-87322] N86-24967
Testing of YUH-61A helicopter transmission in NASA Lewis 2240-kW (3000-hp facility
[NASA-TP-2538] N86-24992
Principles for system level electrochemistry
[NASA-TM-87283] N86-25039
An estimate of the enroute noise of an advanced turboprop airplane NASA-TM-87302 E-3020 NAS 1.15:87302 HC A02/MF A01
[NASA-TM-87302] N86-25217
An experimental investigation of reducing advanced turboprop cabin noise by wing shielding
[NASA-TM-87112] N86-25218
Compensation in epitaxial cubic SiC films
[NASA-TM-87269] N86-25267
Auger electron spectroscopy, secondary ion mass spectroscopy and optical characterization of a-C-H and BN films
[NASA-TM-87258] N86-25268
Thermal desorption study of physical forces at the PTFE surface
[NASA-TM-87090] N86-25284
Stirling Powered Van Progam overview
[NASA-TM-87227] N86-25303
Research and competition: Best partners
[NASA-TM-87313] N86-25321

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.
Shuttle-launch triangular space station
[NASA-CASE-10676-1] N86-24729

Effects of seawater and deionized water at 0 to 80 deg C on the flexural properties of a glass/epoxy composite
[NASA-TM-86544] N86-24758
A computational study of multiple jet and wall interaction
[NASA-TM-86541] N86-24937
Thermal performance evaluation of the infrared telescope dewar subsystem
[NASA-TM-86543] N86-25305

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. NATIONAL SPACE TECHNOLOGY LABS., BAY SAINT LOUIS, MISS.
Ducks Unlimited Joint Research Project
[NASA-TM-88755] N86-25032

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. PASADENA OFFICE, CALIF.
Floating emitter solar cell junction transistor
[NASA-CASE-NPO-16467-1-CU] N86-24908
Method of measuring field funneling and range straggling in semiconductor charge-collecting junctions
[NASA-CASE-NPO-16584-1-CU] N86-25269

NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.
Radio-frequency power delivery system: Procedures for error analysis and self-calibration
[PB86-115680] N86-24929
Metrology for electromagnetic technology: A bibliography of NBS (National Bureau of Standards) publications
[PB86-130234] N86-24975

NATIONAL BUREAU OF STANDARDS, GAITHERSBURG, MD.
Radiometric calibration procedures using the NBS (National Bureau of Standards) MARBLE electronics package
[PB86-129756] N86-24721
Journal of Research of the National Bureau of Standards, volume 90, number 4, July-August 1985
[PB86-137627] N86-24786
Chemical Thermodynamics in Steam Power Cycles Data Requirements
[PB86-130937] N86-24787
Data sources for parameters used in predictive modeling of fire growth and smoke spread
[PB86-130986] N86-24788
Heat transfer in compartment fires near regions of ceiling jet-wall impingement N86-24866
Proceedings of Conference on International Standards
[PB86-130044] N86-24872
Calibration of test systems for measuring power losses of transformers
[PB86-132032] N86-24928
Technology assessment: Methods for measuring the level of computer security
[PB86-129954] N86-25140
Benchmark analysis of database architectures: A case study
[PB86-126687] N86-25162

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLO.
Climate sensitivity of a numerical model of ice-sheet dynamics and thermodynamics
[PB86-119617] N86-25096

NATIONAL INST. FOR OCCUPATIONAL SAFETY AND HEALTH, CINCINNATI, OHIO.
Compendium of protective eyewear
[PB86-135779] N86-25126

NATIONAL OCEAN SERVICE, ANCHORAGE, ALASKA.
Outer Continental Shelf Environmental Assessment Program. Reports of principal investigators, volume 33
[PB86-134780] N86-25061
Outer Continental Shelf Enviromental Assessment Program: Reports of principal investigators, volume 30
[PB86-134756] N86-25063
Outer Continental Shelf Environmental Assessment Program: Reports of principal investigators, volume 31
[PB86-134764] N86-25064
Outer Continental Shelf Environment Assessment Program: Reports of principal investigators, volume 32
[PB86-134772] N86-25065

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.
Omega long-term phase advances
[PB85-233211] N86-24902
Management information (Wave Propagation Laboratory, Boulder, Colorado)
[PB86-139524] N86-25106

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, PRINCETON, N.J.
Geophysical Fluid Dynamics Laboratory activities FY 1985, plans FY 1986
[PB86-113545] N86-25095

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, WASHINGTON, D. C.
Mariners Weather Log, volume 29, number 4, fall 1985
[PB86-142072] N86-25088

NATIONAL PLANNING ASSOCIATION, WASHINGTON, D. C.
Trends in industrial R and D activities in the United States, Europe and Japan, 1963-83
[PB86-141371] N86-25290

NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, BOULDER, COLO.
Omega long-term phase advances
[PB85-233211] N86-24902

NATIONAL TRANSPORTATION SAFETY BOARD, WASHINGTON, D. C.
Aircraft accident/incident summary reports: Denver, Colorado, August 19, 1983; Blountville, Tennessee, July 16, 1983; Tucson, Arizona, February 6, 1983, Cockeysville, Maryland, April 28, 1984; Akron, Ohio, September 30, 1984; Seattle, Washington, October 18, 1984; Miami, Florida, November 11, 1983
[PB85-910409] N86-24675
Safety study. Airline passenger safety education: A review of methods used to present safety information
[PB85-917014] N86-24676

NATIONAL WEATHER SERVICE, FORT WORTH, TEX.
National Weather Service (NWS) Southern Region QPF (Quantitative Precipitation Forecasting) Workshop
[PB85-199164] N86-25094

NATIONAL WEATHER SERVICE, GARDEN CITY, N.Y.
ROTODRAW
[PB86-131828] N86-25139

NATIONAL WEATHER SERVICE, WASHINGTON, D.C.
Monthly and seasonal weather outlook for mid-November to mid-December 1985, volume 39, number 22, November 14, 1985
[PB86-126097] N86-25090
Monthly and seasonal weather outlook for mid-December 1985 to mid-January 1986, volume 39, number 24, December 14, 1985
[PB86-142262] N86-25091
Monthly and seasonal weather outlook for January 1986, volume 40, number 1, December 31, 1985
[PB86-142270] N86-25092
Monthly and seasonal weather outlook for mid-January to mid-February 1986, volume 40, number 2, January 14, 1986
[PB86-145828] N86-25093

NAVAL CIVIL ENGINEERING LAB., PORT HUENEME, CALIF.
Test results for the 2.5-kVA ground fault protector
[AD-A163501] N86-24912

NAVAL FACILITIES ENGINEERING COMMAND, WASHINGTON, D. C.
Centerville Beach. Project completion report
[AD-A163461] N86-25056

NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.
Application of artificial intelligence to improve aircraft survivability
[AD-A164172] N86-24674
Relative positioning of ocean bottom benchmarks AD-A164177 HC A05/MF A01
[AD-A164177] N86-24684
Holographic investigation of solid propellant combustion in a three-dimensional motor
[AD-A164217] N86-24864
Jamming effects on digital communication receivers (timing errors and frequency errors)
[AD-A164199] N86-24900
Optimal estimation of target in clutter (CHAFF) from radar
[AD-A164200] N86-24901
Simulation and performance of brushless dc motor actuators
[AD-A163725] N86-24913
Experimental investigation of turbulent heat transfer in straight and curved rectangular ducts
[AD-A164142] N86-24950
Reciprocity calibration in a plane wave resonator
[AD-A164149] N86-24972
A seawater battery monitor with fiber optic remote data acquisition capability
[AD-A164178] N86-25052
Evaluation of NOGAPS 2.1 (Navy Operational Global Atmospheric Prediction System 2.1) systematic error - winter 1983 - 1984
[AD-A163812] N86-25082
Satellite cloud and precipitation analysis using a minicomputer
[AD-A163821] N86-25084
Applications of wind empirical orthogonal functions in tropical cyclone motion studies
[AD-A164170] N86-25086
Man-machine systems of the 1990 decade: Cognitive factors and human interface issues
[AD-A163865] N86-25123
A single board multiprocessor for real-time contour surface display generation
[AD-A163587] N86-25129
Introduction to the microcomputers for solving radar and electronic warfare problems
[AD-A164143] N86-25135
Microprocessor controller with nonvolatile memory implementation
[AD-A164152] N86-25136
Analysis and design of a parameterized protocol converter
[AD-A164171] N86-25137
Image segmentation using the military specification 1750A
[AD-A164180] N86-25138
Analysis of a distributed decision algorithm
[AD-A164181] N86-25159
An adaptive collision resolution protocol for random accessed channels
[AD-A164169] N86-25165
Surface construction from planar contours
[AD-A163610] N86-25184
Higher order residual analysis for nonlinear time series with autoregressive correlation structures
[AD-A163611] N86-25185
Absolute bounds on set intersection and union sizes from distribution information
[AD-A164025] N86-25190
Infrared background and target measurement HC A05/MF A01
[AD-A163567] N86-25238
Remote measurement of the atmospheric isoplanatic angle and determination of refractive turbulence profiles by direct inversion of the scintillation amplitude covariance function with Tikhonov regularization
[AD-A163629] N86-25239
Detection and exploitation of vibration induced optical amplitude modulation
[AD-A164179] N86-25244
Analysis of contrast sensitivity and spectral response of imaging systems
[AD-A164228] N86-25247
Defense data Network/TOPS-20 tutorial: An interactive computer program
[AD-A163675] N86-25294

NAVAL RESEARCH LAB., WASHINGTON, D. C.
Cracking resistance in a 4.5-inch (114-mm) plate of 7075-T7351 aluminum alloy
[AD-A164229] N86-24829
A gated microchannel plate image intensifier packaged in a reflex camera back
[AD-A163015] N86-24970
Nonlinear analysis of efficiency enhancement in Ubitron/Free-Electron laser amplifiers
[AD-A163619] N86-24980
The axial injection TEM orbitron maser
[AD-A164166] N86-24985
Induced Resonance Electron Cyclotron (IREC) quasi-optical maser
[AD-A164167] N86-24986
An assessment of data quality and quantity from airborne cloud physics projects from 1974 through 1984
[DOT/FAA/CT-85/37] N86-25079
A transducer for bottom-scattering measurements
[AD-A163987] N86-25222
Laser interaction in long-scalelength plasmas
[AD-A163604] N86-25262

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, ANNAPOLIS, MD.
Effect of forced convection heat transfer on weld pools
[AD-A163970] N86-24998

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, BETHESDA, MD.
Permanent file backup for the CDC mass store system
[AD-A163524] N86-25128

NAVAL SUBMARINE MEDICAL RESEARCH LAB., GROTON, CONN.
The effect of cold training and the wearing of gloves on manual performance in the cold: A comparison of pure ability and operational tasks
[AD-A163893] N86-25124
An evaluation of color sets for CRT displays
[AD-A163894] N86-25125

NAVAL SURFACE WEAPONS CENTER, SILVER SPRING, MD.
A volumetric method for titrimetric analysis of hydrogen peroxide
[AD-A163582] N86-24774
Uniform transverse magnetic field inside a long cylinder
[AD-A163459] N86-25210

NAVAL UNDERWATER SYSTEMS CENTER, NEW LONDON, CONN.
Effects of convergence zone multipath on crosscorrelation
[AD-A163650] N86-25221

NIIGATA UNIV. (JAPAN).
Kink stability of long ion layers
[IPPJ-758] N86-25250
NORTHROP SERVICES, INC., RESEARCH TRIANGLE PARK, N. C.
Emissions from a light-duty diesel: Ambient temperature and fuel effects
[PB86-131349] N86-24865
Monte Carlo simulation of two-particle relative diffusion using Eulerian statistics: Extended abstract
[PB86-116548] N86-25077
NORTHWESTERN UNIV., EVANSTON, ILL.
Synthesis and properties of elevated temperature P/M aluminum alloys
[AD-A164158] N86-24827
NORWEGIAN DEFENCE RESEARCH ESTABLISHMENT, KJELLER.
Chemically induced damage to the hippocampal formation
[NDRE/PUBL-86/1002] N86-25112
NUCLEAR REGULATORY COMMISSION, WASHINGTON, D. C.
Disposal of high-level radioactive wastes in the unsaturated zone: Technical considerations and response to comments
[TI86-900170] N86-25236

O

OAK RIDGE NATIONAL LAB., TENN.
Joining of ceramics for advanced heavy-duty diesels
[NASA-CR-175019] N86-24846
Some advances in fracture studies under the Heavy-Section Steel Technology Program
[TI85-018096] N86-25029
Testimony of Fred R. Mynatt, Associate Director for Nuclear and Engineering Technologies, Oak Ridge National Laboratory, before the Subcommittee on Energy Research and Production of the Committee on Science and Technology, US House of Representatives
[DE86-002234] N86-25053
OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, D. C.
Managing federal information resources: Report under the Paperwork Reduction Act of 1980
[PB86-247682] N86-25299
OFFICE OF NAVAL RESEARCH, LONDON (ENGLAND).
European Science Notes, Volume 40, Number 3
ESN-40-3 HC A03/MF A01
[AD-A164182] N86-25298
OHIO STATE UNIV., COLUMBUS.
A study of a collision avoidance system mounted on a curved ground plane
[NASA-CR-176771] N86-24677
Hot gas corrosion of silicon based ceramics
[AD-A163810] N86-24850
NCTR using a polarization-agile coherent radar system
[AD-A163528] N86-24882
Joint services electronics program
[AD-A164151] N86-24924
Separated flows
[AD-A163551] N86-24939
OLD DOMINION UNIV., NORFOLK, VA.
Vapor-screen flow-visualization experiments in the NASA Langley 0.3-m transonic cryogenic tunnel
[NASA-CR-3984] N86-24661
Investigation of paramagnetic response of metallic epoxies
[NASA-CR-176551] N86-24761
OREGON GRADUATE CENTER FOR STUDY AND RESEARCH, BEAVERTON.
Remote sensing of atmospheric winds by utilizing speckle-turbulence interaction and optical heterodyne detection
[AD-A164187] N86-25087

P

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
Synthesis of alkyl and aryl phosphazene high polymers
[AD-A163543] N86-24848
Tailoring multiphase ceramics
[AD-A164010] N86-24855
PITTSBURGH UNIV., PA.
On detection of number of signals in presence of white noise
[AD-A164211] N86-24927
POLYTECHNIC INST. OF NEW YORK, FARMINGDALE.
A morphological study of waves in the thermosphere using DE-2 observations
[NASA-CR-176775] N86-25070
PRATT AND WHITNEY AIRCRAFT, EAST HARTFORD, CONN.
Life prediction and constitutive models for engine hot section anisotropic materials program
[NASA-CR-174952] N86-25003
PRATT AND WHITNEY AIRCRAFT, WEST PALM BEACH, FLA.
Altitude ignition/lean decel study
[AD-A163052] N86-24781
PRESIDENTIAL COMMISSION ON THE SPACE SHUTTLE CHALLENGER ACCIDENT, WASHINGTON, D.C.
Report of the Presidential Commission on the Space Shuttle Challenger Accident, volume 1 N86-24726
PRINCETON UNIV., N. J.
Numerical solution of the Euler equations by implicit schemes with multiple grids N86-24655
On stellar streaming motions in triaxial objects: The case of the galactic bulge N86-25308
PUERTO RICO UNIV., RIO PIEDRAS.
Analytic solution of the molecular Ornstein-Zernike equation for non-spherical molecules spheres with anisotropic surface adhesion
[AD-A163451] N86-24771
An improved closure of the Born-Green-Yvon equation for the electric double layer
[AD-A163452] N86-24772
PURDUE UNIV., WEST LAFAYETTE, IND.
The science of and advanced technology for cost-effective manufacture of high precision engineering products. Volume 4. Thermal effects on the accuracy of numerically controlled machine tool
[AD-A163598] N86-24871

R

RAND CORP., SANTA MONICA, CALIF.
The RAND-ABEL (Trademark) programming language: Reference manual
[AD-A163564] N86-25148
RENSSELAER POLYTECHNIC INST., TROY, N.Y.
Three dimensional finite element analysis of failure in composite laminates N86-24768
Lubricant foaming and aeration study, part 2
[AD-A163696] N86-24849
RESEARCH TRIANGLE INST., RESEARCH TRIANGLE PARK, N.C.
Modeling transport by convective clouds for regional air pollution models
[PB86-144623] N86-25060
An empirical study of flight control software reliability
[NASA-CR-178058] N86-25145
ROCHESTER UNIV., N. Y.
Analysis of the gain-coupled distributed feedback laser as a source of short optical pulses N86-24987
ROCKWELL INTERNATIONAL CORP., CANOGA PARK, CALIF.
Radiation augmented propulsion feasibility
[AD-A163983] N86-24752
ROCKWELL INTERNATIONAL CORP., DOWNEY, CALIF.
Space platform expendables resupply concept definition study. Volume 1: Executive summary
[NASA-CR-178820] N86-24733
Space platform expendables resupply concept definition study, volume 2
[NASA-CR-178821] N86-24734
Space platform expendables resupply concept definition study. Volume 3: Work breakdown structure and work breakdown structure dictionary
[NASA-CR-178822] N86-24735
ROCKWELL INTERNATIONAL CORP., EL SEGUNDO, CALIF.
CADS: A Computer Aided Design System, volume 1
[AD-A163556] N86-25147
ROCKWELL INTERNATIONAL CORP., HUNTSVILLE, ALA.
Space platform expendables resupply concept definition study
[NASA-CR-178819] N86-24732
ROME AIR DEVELOPMENT CENTER, GRIFFISS AFB, N.Y.
Optical disk technology for large scale mass storage
[AD-A163453] N86-25127
ROYAL SIGNALS AND RADAR ESTABLISHMENT, MALVERN (ENGLAND).
Mode S data link phase coding
[AD-A163745] N86-24886
A database for compounding stress intensity factors
[AD-A163779] N86-25023
Routing of high data rate signals using degenerate four wave mixing in BSO
[AD-A163746] N86-25240

S

SANDIA NATIONAL LABS., ALBUQUERQUE, N. MEX.
Microstructures of surface-melted alloys
[DE86-002916] N86-24819
SCIENCE APPLICATIONS INTERNATIONAL CORP., MCLEAN, VA.
Fire resistant fuel program analysis and program management documentation
[AD-A163724] N86-24862
SOFTWARE SYSTEMS TECHNOLOGIES, INC., COLLEGE PARK, MD.
Benchmark analysis of database architectures: A case study
[PB86-126687] N86-25162
SOUTHWEST RESEARCH INST., SAN ANTONIO, TEX.
Evaluation of Army engine oils in Hydraulic/Power transmission system components
[AD-A163527] N86-24847
Development of a test method to determine potential peroxide content in turbine fuels
[AD-A163590] N86-24858
SRI INTERNATIONAL CORP., MENLO PARK, CALIF.
Determination of initial chemical steps in the gas-phase decomposition of energetic molecules
[AD-A163751] N86-24777
A Model of Airflow and Diffusion In Complex Terrain (MADICT)
[AD-A163819] N86-25083
Studies of autoionizing states relevant to dielctronic recombination
[DE86-002908] N86-25264
STANFORD UNIV., CALIF.
The development and test of a pulse-counting imaging detector system for solar system studies at ultraviolet and visible wavelengths
[NASA-CR-176671] N86-24965
Studies on radiative collisional and ultraviolet lasers
[AD-A163901] N86-24982
Energy transfer and photochemistry in biomimetic solar conversion
[PB86-142114] N86-25054
Statistical inferences in cross-lagged panel studies
[AD-A163892] N86-25120
Decision procedures
[AD-A163049] N86-25173
Tests for the extreme value and Weibull distributions based on normalized spacings
[AD-A163566] N86-25182
Exploratory projection pursuit
[AD-A163019] N86-25207
STATE UNIV. OF NEW YORK, ALBANY.
Water jet/spray measurement analysis
[NASA-CR-178802] N86-24930
STATE UNIV. OF NEW YORK, STONY BROOK.
On stratification and wind-induced mixing in the Chesapeake Bay N86-25107
STIRLING THERMAL MOTORS, INC., ANN ARBOR, MICH.
Experimental assessment of advanced Stirling component concepts
[NASA-CR-174994] N86-25302
SYRACUSE UNIV., N. Y.
Electromagnetic scattering from a slotted TM cylindrical conductor by the pseudo-image method
[AD-A163782] N86-24887
SYSTEM DEVELOPMENT CORP., MCLEAN, VA.
Technology assessment: Methods for measuring the level of computer security
[PB86-129954] N86-25140
SYSTEMS CONTROL TECHNOLOGY, INC., PALO ALTO, CALIF.
Time domain algorithms
[AD-A163054] N86-24895
SYSTEMS TECHNOLOGY, INC., HAWTHORNE, CALIF.
Space Shuttle flying qualities criteria assessment. Phase 5: Data acquistion and analysis
[NASA-CR-166618] N86-24704

T

TENNESSEE UNIV. SPACE INST., TULLAHOMA.
Laser thermal propulsion
[AD-A164163] N86-24753
TEXAS A&M UNIV., COLLEGE STATION.
Damage models for delamination and transverse fracture in fibrous composites
[AD-A164164] N86-24765
Residual-stress induced damage in composite materials
[AD-A164191] N86-24767
Nonparametric and parametric estimation of wave statistics and spectra
[PB86-141967] N86-25105

TEXAS UNIV., AUSTIN.
Experimental study of the supersonic turbulent boundary layer on a blunted axisymmetric body
[AD-A163736] N86-24669
A semi-analytic theory for satellite orbit prediction N86-24718
Spectral characteristics of radar echoes from aircraft-dispensed chaff N86-24904
Motion in the restricted problem of three bodies for small values of the mass parameter N86-25201
Particle simulation of low frequency fluctuations in a sheared magnetic field N86-25214
Theoretical studies of magnetized plasma turbulence: Ion-cyclotron turbulence, and shear flow turbulence and its applications to tokamak edge phenomena N86-25265
A polarimetric study of the interstellar medium in Taurus dark clouds N86-25306
Molecular outflows and mass loss in pre-main-sequence stars N86-25309

TORONTO UNIV., DOWNSVIEW (ONTARIO).
Review of modified hemoglobin solutions for use as temporary blood substitutes
[AD-A164210] N86-25114

TRANSPORTATION SYSTEMS CENTER, CAMBRIDGE, MASS.
Reliability of navigation service provided by the global positioning system
[AD-A163541] N86-24680
Test results for developing revised LORAN-C protection criteria AD-A164139 DOT-TSC-CG-85-4 DOT-CG-N-1-86 HC A04/MF A01
[AD-A164139] N86-24683

TRW DEFENSE AND SPACE SYSTEMS GROUP, HUNTSVILLE, ALA.
Ground Software Maintenance Facility (GSMF) user's manual. Appendices NASA-CR-178806 NAS 1.26:178806 Rept-41849-G159-026-App HC A05/MF A01
[NASA-CR-178806] N86-25144

TRW, INC., REDONDO BEACH, CALIF.
Improved piston ring materials for 650 deg C service
[NASA-CR-175058] N86-24845
Satellite voice broadcase system study. Volume 1: Executive summary
[NASA-CR-174904] N86-24876

TRW SPACE TECHNOLOGY LABS., REDONDO BEACH, CALIF.
Satellite voice broadcast system study, volume 2
[NASA-CR-174905] N86-24877

TRW SYSTEMS GROUP, HUNTSVILLE, ALA.
Ground Software Maintenance Facility (GSMF) system manual
[NASA-CR-178804] N86-25143

U

ULTRASYSTEMS, INC., IRVINE, CALIF.
Biomass economy
[AD-A163647] N86-25048

UNITED KINGDOM ATOMIC ENERGY AUTHORITY, HARWELL (ENGLAND).
Transverse microsections of thin oxide scales for AEM studies
[AERE-R-11266] N86-24833
Crystallographic texture: Experimental geometry and defocussing correction
[AERE-R-11723] N86-25266
Impurity diffusion in NiO grain boundaries
[AERE-R-11763] N86-25280

UNITED KINGDOM ATOMIC ENERGY AUTHORITY, RISLEY (ENGLAND).
Static and dynamic tensile tests on wide X 6 CrNi 18 11 steel plates to demonstrate the integrity of the reactor tank for the SNR 300 fast sodium-cooled reactor
[BLL-RISLEY-TR-5280-(9091.9F)] N86-25009
Behaviour of dynamically loaded pipes with circumferential flaws under internal pressure and external bending loads
[BLL-RISLEY-TR-5278-(9091.9F)] N86-25010
Behaviour of WB 35 pipe steel under dynamic loading in high-speed tensile tests
[BLL-RISLEY-TR-5279-(9091.9F)] N86-25011

UNITED TECHNOLOGIES CORP., EAST HARTFORD, CONN.
ALESEP. Part 2: A computer program for the analysis of leading edge separation bubbles on infinite swept wings
[NASA-CR-178015] N86-24864
Jet shielding of jet noise
[NASA-CR-3966] N86-25219

UNITED TECHNOLOGIES CORP., SOUTH WINDSOR, CONN.
Advanced on-site power plant development technology program
[NASA-CR-174709] N86-25040

UNITED TECHNOLOGIES RESEARCH CENTER, EAST HARTFORD, CONN.
Advanced turboprop vibratory characteristics
[NASA-CR-174708] N86-24693
Detection and location of ballistic damage in composite materials using acoustic emission methods
[AD-A164183] N86-24766
Investigation of breadboard temperature profiling system for SSME fuel preburner diagnostics
[NASA-CR-178799] N86-24957
Helicopter rotor noise due to ingestion of atmospheric turbulence
[NASA-CR-3973] N86-25216

UNIVERSITY OF SOUTH FLORIDA, TAMPA.
Microenvironmental moisture research
[AD-B157859] N86-25004

UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES.
Shifting the closed-loop spectrum in the optimal linear quadratic regulator problem for hereditary systems
[NASA-CR-178082] N86-25167
Numerical approximation for the infinite-dimensional discrete-time optimal linear-quadratic regulator problem
[NASA-CR-178081] N86-25176

UNIVERSITY OF SOUTHERN MISSISSIPPI, HATTIESBURG.
Set-up and demonstration of a Low Energy Electron Magnetometer (LEEM)
[NASA-CR-178091] N86-24963

V

VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG.
A computational model for contact stress problems AD-A164190
[AD-A164190] N86-25027

VIRGINIA UNIV., CHARLOTTESVILLE.
Analytic solution of the molecular Ornstein-Zernike equation for non-spherical molecules spheres with anisotropic surface adhesion
[AD-A163451] N86-24771
The implementation and use of Ada on distributed systems with high reliability requirements
[NASA-CR-176760] N86-25142

W

WASHINGTON UNIV., SEATTLE.
A one-level mesoscale model for diagnosing surface winds in mountainous and coastal regions N86-25097
Near-inertial wave propagation in geostrophic shear N86-25108
High temperature gas energy transfer
[AD-A163020] N86-25229
Vibrational energy transfer at a liquid gallium surface. Activation of unimolecular cyclobutene isomerization
[AD-A163023] N86-25230
Abundances of heavy cosmic rays at energies up to 1000 GeV/amu N86-25318

WASHINGTON UNIV., ST. LOUIS, MO.
Phase-insensitive detection and the method of moments for ultrasonic tissue characterization N86-25223
Abundances and energy spectra of high energy heavy cosmic-ray nuclei N86-25319

WAYNE STATE UNIV., DETROIT, MICH.
Dissociative electron attachment to rovibrationally excited molecules
[AD-A163065] N86-25228

WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER, PITTSBURGH, PA.
Thin film technology of high-critical-temperature superconducting electronics
[AD-A136053] N86-25278

WHITCOMBE (DAVID W.), MANHATTAN BEACH, CALIF.
The bi-metric absolute differential calculus with applications to general relativity N86-25281

WISCONSIN UNIV., MADISON.
Stationary motions and incompressible limit for compressible viscous fluids
[AD-A163600] N86-24941
L(2) stability for weak solutions of the Navier-Stokes equations in R(3)
[AD-A163612] N86-24942
On K-BKZ and other viscoelastic models as continuum generalization of the classical Spring-Dashpot models
[AD-A163703] N86-24943
Characterization of the consistent weighted regression estimators
[AD-A163605] N86-25183
The Chinese Remainder Problem and polynomial interpolation
[AD-A163626] N86-25186
Improved interval bounds for ranges of functions
[AD-A163627] N86-25187
Maximum likelihood recursion and stochastic approximation in sequential designs
[AD-A163628] N86-25188
Remarks on the existence and uniqueness of unbounded viscosity solutions of Hamilton-Jacobi equations
[AD-A163701] N86-25189
Convergence of cubic spline interpolation with the Not-A-Knot condition
[AD-A163705] N86-25190
A proof of Grace's theorem by induction
[AD-A163714] N86-25191
Bias and efficiency of the consistent weighted regression estimators in finite population sampling HC A03/MF A01
[AD-A163601] N86-25203
A convergence theorem for Newton's method in Banach spaces
[AD-A163625] N86-25209
On the two-phase Stefan problem with interfacial energy and entropy
[AD-A163715] N86-25211
Time and state resolved studies of molecular decomposition
[AD-A163881] N86-25227

WOLVERHAMPTON POLYTECHNIC (ENGLAND).
Accurate sturcture factor determination of binary cubic solid solutions
[DE86-002891] N86-24832

WOODS HOLE OCEANOGRAPHIC INSTITUTION, MASS.
Current variability near the southeast Newfoundland ridge
[AD-A163644] N86-25102
A compilation of moored current meter and wind recorder data. Volume 38. Long-term upper ocean study (LOTUS) (Moorings 787, 788, 789, 790, 792), April 1983 - May 1984
[AD-A163897] N86-25103

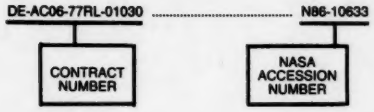
WYLE LABS., INC., HUNTSVILLE, ALA.
A data base and analysis program for shuttle main engine dynamic pressure measurements
[NASA-CR-178806] N86-24750

WYOMING UNIV., LARAMIE.
Analysis of the stress state in an Iosipescu shearteat specimen
[NASA-CR-176745] N86-24755

Y

YALE UNIV., NEW HAVEN, CONN.
Education and computers: An AI (Artificial Intelligence) perspective
[AD-A163618] N86-25170

Typical Contract Number Index Listing

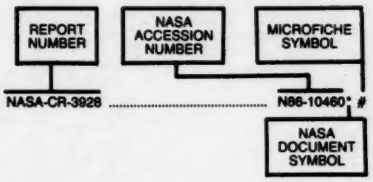


Listings in this index are arranged alphanumerically by contract number. Under each contract number the NASA accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order. The NASA accession number denotes the number by which the citation is identified.

NAS3-23520 ..... N86-24991
N00014-82-C-0617 ..... N86-25278
AF-AFOSR-ISSA-85-00093 ..... N86-24855
AF-AFOSR-0005-82 ..... N86-24827
AF-AFOSR-0030-81 ..... N86-25231
AF-AFOSR-0043-83 ..... N86-24753
AF-AFOSR-0059-84 ..... N86-25197
AF-AFOSR-0068-84 ..... N86-24765
AF-AFOSR-0069-84 ..... N86-24767
AF-AFOSR-0143-84 ..... N86-25228
AF-AFOSR-0309-84 ..... N86-25167
N86-25176
AF-AFOSR-0393-84 ..... N86-25167
N86-25176
BRSG-RR-07013-14 ..... N86-25119
DA PROJ. 1L1-62105-AH-84 ..... N86-24766
DA PROJ. 1L1-62209-AH-76 ..... N86-24665
DA PROJ. 1L1-62622-A-554 ..... N86-24863
DA PROJ. 1L1-62733-AH-20 ..... N86-25049
DA PROJ. 1L2-63627-D-155 ..... N86-24784
DA PROJ. 1V4-63702-DG-11 ..... N86-25047
DAAG29-79-C-0134 ..... N86-24916
DAAG29-80-C-0041 ..... N86-24941
N86-24942
N86-24943
N86-25183
N86-25186
N86-25187
N86-25188
N86-25189
N86-25190
N86-25191
N86-25203
N86-25209
N86-25211
DAAG29-81-K-0054 ..... N86-25277
DAAG29-81-K-0108 ..... N86-25154
DAAG29-81-K-0129 ..... N86-25241
DAAG29-82-G-0110 ..... N86-25085
DAAG29-82-K-0002 ..... N86-25211
DAAG29-82-K-0079 ..... N86-24776
DAAG29-82-K-0085 ..... N86-25153
DAAG29-82-K-0086 ..... N86-25025
DAAG29-82-K-0117 ..... N86-25242
DAAG29-82-K-0149 ..... N86-24850
DAAG29-82-K-0150 ..... N86-25227
DAAG29-82-K-0156 ..... N86-25120
DAAG29-82-K-0166 ..... N86-24916
DAAG29-82-K-0168 ..... N86-25006
N86-25204
DAAG29-82-K-0169 ..... N86-24777
DAAG29-82-K-0194 ..... N86-25115
DAAG29-83-K-0009 ..... N86-25083
DAAG29-83-K-0073 ..... N86-24856
DAAG29-83-K-0077 ..... N86-25087
DAAG29-83-K-0175 ..... N86-24775
DAAG29-84-C-0025 ..... N86-24914
DAAG29-84-C-0054 ..... N86-24766
DAAG29-84-G-0007 ..... N86-24981
DAAG29-84-K-0058 ..... N86-24716
DAAG29-84-K-0073 ..... N86-25075
DAAG29-84-K-0078 ..... N86-24887
DAAG29-84-M-0432 ..... N86-24669
DAAG29-85-K-0197 ..... N86-25225
DAAK11-78-C-0054 ..... N86-24952
DAAK70-79-C-0249 ..... N86-25047
DAAK70-81-C-0059 ..... N86-25293
DAAK70-82-C-0001 ..... N86-24858
DAAK70-83-C-0035 ..... N86-25049
DAAK70-84-C-0071 ..... N86-24847
DAAK70-84-D-0053 ..... N86-24862
DAAK70-85-C-0007 ..... N86-24858
DAJA45-83-C-0040 ..... N86-24784
DCA100-84-C-0009 ..... N86-25163
DE-AC02-76CH-00016 ..... N86-24852
DE-AC02-76ER-02853 ..... N86-25234
DE-AC02-78ET-51013 ..... N86-25263
DE-AC03-76SF-00096 ..... N86-25283
DE-AC03-76SF-00098 ..... N86-24832
DE-AC04-76DP-00789 ..... N86-24819
DE-AC05-84OR-21400 ..... N86-24846
N86-25029
N86-25053
DE-AC07-76ID-01570 ..... N86-25028
DE-AC08-83NV-10282 ..... N86-25036
DE-AI01-76ET-20356 ..... N86-25045
DE-AI01-77CS-51040 ..... N86-25302
DE-AI01-80CS-50194 ..... N86-24845
DE-AI01-85CE-50112 ..... N86-25303
DE-AI01-85CE-89008 ..... N86-25043
DE-AI21-80ET-17088 ..... N86-25040
DE-AM04-80AL-13137 ..... N86-25044
DE-AT03-79ER-10376 ..... N86-25264
DE-FG22-82PC-50800 ..... N86-24785
DEN3-289 ..... N86-25040
DEN3-351 ..... N86-25302
DTFA03-83-A-00309 ..... N86-25079
DTRS-83-C-00029 ..... N86-24683
EPA-68-02-4059 ..... N86-25060
FINEP-537/CT N86-25178
F04611-84-C-0047 ..... N86-24752
F04701-83-C-0084 ..... N86-24915
N86-24979
F04701-85-C-086 ..... N86-24851
F04701-85-C-0086 ..... N86-25051
N86-25071
N86-25072
N86-25232
F08635-84-C-0229 ..... N86-25048
F19628-82-K-0008 ..... N86-25279
F19628-85-C-0002 ..... N86-24920
N86-25312
F30602-80-C-0169 ..... N86-25004
F30602-82-C-0127 ..... N86-25007
F30602-84-C-0016 ..... N86-24895
F33615-80-C-2017 ..... N86-24849
F33615-81-C-3229 ..... N86-25147
F33615-83-C-2322 ..... N86-24688
F33615-83-C-2329 ..... N86-24781
F49620-80-C-0077 ..... N86-24894
F49620-83-C-0003 ..... N86-24828
F49620-83-C-0016 ..... N86-24982
F49620-84-C-0054 ..... N86-24742
F49620-85-C-0008 ..... N86-24927
F49620-85-C-0015 ..... N86-25155
F49620-85-K-0009 ..... N86-25157
N86-25245
GRI-5083-260-0824 ..... N86-25054
JPL PROJ. 5101-280 ..... N86-25045
JPL PROJ. 5101-296 ..... N86-25043
JPL PROJ. 5105-155 ..... N86-25044
MDA903-85-C-0030 ..... N86-25148
MIPR-ARO-62-82 ..... N86-24852
MIPR-ARO-103-85 ..... N86-24982
NAGW-627 ..... N86-24965
NAG1-126 ..... N86-24730
NAG1-199 ..... N86-24702
NAG1-260 ..... N86-25142
NAG1-272 ..... N86-24755
NAG1-372 ..... N86-24663
NAG1-379 ..... N86-24932
NAG1-401 ..... N86-24659
NAG1-586 ..... N86-24905
NAG2-302 ..... N86-25169
NAG3-11 ..... N86-24933
N86-24955
NAG3-55 ..... N86-24990
NAG3-280 ..... N86-24818
NAG3-282 ..... N86-25042
NAG3-328 ..... N86-25002
NAG3-366 ..... N86-24691
NAG3-379 ..... N86-25310
NAG3-673 ..... N86-24932
NAG5-315 ..... N86-25069
NAG5-417 ..... N86-25078
NAG5-436 ..... N86-25311
NAG5-479 ..... N86-25070
NASA ORDER H-78175-B N86-24712
NASA ORDER H-78743-B N86-24930
NASW-3299 ..... N86-24751
NASW-3676 ..... N86-25109
NASW-4004 ..... N86-24652
N86-24701
N86-24710
N86-24736
N86-24843
N86-24844
N86-24936
N86-25000
N86-25041
N86-25146
N86-25177
NASW-4005 ..... N86-24769
N86-24815
N86-24816
N86-24842
N86-24910
N86-25315
NASW-4006 ..... N86-24770
N86-24868
NAS1-16489 ..... N86-25145
NAS1-16585 ..... N86-24664
NAS1-16689 ..... N86-25219
NAS1-16978 ..... N86-25215
NAS1-17070 ..... N86-25167
N86-25176
NAS1-17096 ..... N86-25216
NAS1-17435 ..... N86-24963
NAS1-17556 ..... N86-24678
NAS1-17658 ..... N86-24745
NAS1-17993 ..... N86-24761
NAS1-17999 ..... N86-24660
NAS1-18107 ..... N86-25167
N86-25176
NAS2-11431 ..... N86-24704
NAS3-22110 ..... N86-24938
NAS3-22238 ..... N86-25046
NAS3-23159 ..... N86-24906
NAS3-23272 ..... N86-24931
NAS3-23533 ..... N86-24693
NAS3-23858 ..... N86-24746
NAS3-23939 ..... N86-25003
NAS3-24232 ..... N86-24877
N86-24878
NAS3-24233 ..... N86-24875
N86-24876
NAS3-24349 ..... N86-24695
NAS3-24386 ..... N86-24760
NAS5-28791 ..... N86-25291
NAS6-2520 ..... N86-25100
NAS7-918 ..... N86-25034
N86-25043
N86-25044
N86-25045
N86-25269
NAS7-919 ..... N86-24908
NAS8-32350 ..... N86-25143
N86-25144
NAS8-34343 ..... N86-24750
NAS8-34655 ..... N86-24957
NAS8-35618 ..... N86-24732
N86-24733
N86-24734
N86-24735
NAS8-36304 ..... N86-24719
NAS8-36366 ..... N86-25121
NAS8-36646 ..... N86-24720

N86-24966
NAS10-10285 ..... N86-25122
NATO-343/85 ..... N86-24932
NA80RA-H-00002 ..... N86-25104
NA83AA-D-00061 ..... N86-25105
NCC1-50 ..... N86-25001
NCC3-43 ..... N86-24817
NGR-05-002-160 ..... N86-25017
NGT-47-003-029 ..... N86-24661
NRC FIN-B7499 ..... N86-25067
NRC-04-84-127 ..... N86-25067
NSF ATM-82-17015 ..... N86-25096
NSF ATM-84-13574 ..... N86-24894
NSF CEE-82-19358 ..... N86-25089
NSF CEE-84-13362 ..... N86-25089
NSF DMS-84-04116 ..... N86-25211
NSF DPP-82-07098 ..... N86-25076
NSF INT-85-14196 ..... N86-24932
NSF MSM-83-20307 ..... N86-24932
NSF SRS-83-07769 ..... N86-25290
NSG-1498 ..... N86-24677
NSG-7610 ..... N86-25069
N00014-75-C-0476 ..... N86-25073
N00014-75-C-0685 ..... N86-24848
N00014-75-C-0690 ..... N86-25229
N86-25230
N00014-76-C-0197 ..... N86-25102
N86-25103
N00014-76-C-0260 ..... N86-24940
N00014-76-C-0333 ..... N86-24939
N00014-76-C-0475 ..... N86-25182
N00014-77-C-0387 ..... N86-25276
N00014-78-C-0049 ..... N86-24924
N00014-79-C-0801 ..... N86-25181
N00014-80-C-0792 ..... N86-25274
N00014-81-C-0591 ..... N86-25119
N00014-81-C-0776 ..... N86-24771
N86-24772
N00014-81-K-0004 ..... N86-25173
N00014-82-K-0149 ..... N86-25170
N00014-82-K-0183 ..... N86-25074
N00014-83-C-0447 ..... N86-24925
N00014-83-C-0680 ..... N86-25275
N00014-83-D-0689 ..... N86-25021
N00014-83-F-0031 ..... N86-24831
N00014-83-K-0385 ..... N86-24871
N00014-83-K-0472 ..... N86-25207
N00014-83-K-0572 ..... N86-25271
N00014-83-K-0587 ..... N86-24996
N00014-84-C-0134 ..... N86-25103
N00014-84-K-0144 ..... N86-25101
N00014-84-K-0468 ..... N86-24764
N00014-84-K-0545 ..... N86-25270
N00014-84-K-0552 ..... N86-25027
N00014-85-C-0079 ..... N86-25172
N00014-85-C-0857 ..... N86-24762
N00014-85-C-0863 ..... N86-25287
N00014-85-K-0108 ..... N86-25170
N00014-85-K-0177 ..... N86-25272
N86-25273
N00014-85-K-0292 ..... N86-24927
N00014-85-K-0365 ..... N86-24830
N00014-85-K-0427 ..... N86-24820
N00014-85-K-0667 ..... N86-25020
N00014-85-K-0821 ..... N86-25224
N62583-85-M-T176 ..... N86-24870
N68001-85-C-0350 ..... N86-24822
N86-24823
N86-24824
PROJ. A-4168 ..... N86-24905
W-7405-ENG-36 ..... N86-24953
N86-24954
N86-25059
N86-25161
W-7504-ENG-48 ..... N86-25160
55-66-11 ..... N86-25169
141-20-10-04 ..... N86-24962
141-20-10-43 ..... N86-24963
481-02-02 ..... N86-24748
483-36-23-03 ..... N86-24737
505-31-04 ..... N86-24934
505-31-33-11 ..... N86-25220
505-31-33-12 ..... N86-25219
505-31-83-01 ..... N86-25167
N86-25176
505-33-7C N86-24991
505-33-43-07 ..... N86-24685
505-33-53 ..... N86-24686
505-34-01 ..... N86-25166
505-43-52 ..... N86-24694
505-45-13-01 ..... N86-24672
505-45-58 ..... N86-25218
505-60-12 ..... N86-25310
505-60-21 ..... N86-24661
505-60-21-01 ..... N86-24664
505-61-01-02 ..... N86-24662
N86-24709
505-61-51-10 ..... N86-24665
505-61-71-03 ..... N86-24660
505-62-01 ..... N86-24691
N86-24697
N86-24958
N86-24959
N86-24964
N86-24967
505-62-21 ..... N86-24961
505-62-51 ..... N86-24990
N86-24992
505-62-91 ..... N86-24658
505-63-01 ..... N86-24835
N86-24836
N86-24839
505-63-11 ..... N86-24756
N86-24757
N86-24759
N86-24813
N86-24817
N86-24818
N86-24869
505-63-21-01 ..... N86-24657
N86-24663
505-66-11 ..... N86-24587
505-68-11 ..... N86-24667
506-41-4A N86-24747
506-41-21 ..... N86-25039
506-42-21 ..... N86-24746
506-42-32 ..... N86-24749
506-43-11 ..... N86-24838
N86-25002
506-43-41-02 ..... N86-24731
506-43-51-01 ..... N86-25019
506-44-22 ..... N86-25267
506-45-21-01 ..... N86-25168
506-46-11-03 ..... N86-24745
506-46-21-01 ..... N86-24703
506-48 ..... N86-24704
506-53-12 ..... N86-25284
506-55-72 ..... N86-24906
506-58-22 ..... N86-24907
N86-25268
506-60-12 ..... N86-24722
506-61-41-02 ..... N86-24659
533-05-01 ..... N86-24837
535-03-01 ..... N86-24695
N86-25217
643-10-01 ..... N86-24881
643-10-20 ..... N86-24876
N86-24878
644-11-00 ..... N86-25034
678-12-04-09 ..... N86-24744
776-31-41-02 ..... N86-25215
776-52-61 ..... N86-25043
N86-25045
776-81-62 ..... N86-25044
778-35-13 ..... N86-25303

Typical Report Number Index Listing



Listings in this index are arranged alphanumerically by report number. The NASA accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

AD-A133968 ..... N86-24692 #
AD-A136053 ..... N86-25278 #
AD-A162827 ..... N86-25197 #
AD-A163015 ..... N86-24970 #
AD-A163017 ..... N86-25051 #
AD-A163018 ..... N86-24863 #
AD-A163019 ..... N86-25207 #
AD-A163020 ..... N86-25229 #
AD-A163022 ..... N86-24894 #
AD-A163023 ..... N86-25230 #
AD-A163024 ..... N86-25172 #
AD-A163025 ..... N86-25073 #
AD-A163048 ..... N86-25074 #
AD-A163049 ..... N86-25173 #
AD-A163052 ..... N86-24781 #
AD-A163054 ..... N86-24895 #
AD-A163061 ..... N86-25104 #
AD-A163065 ..... N86-25228 #
AD-A163438 ..... N86-25287 #
AD-A163442 ..... N86-25181 #
AD-A163450 ..... N86-25270 #
AD-A163451 ..... N86-24771 #
AD-A163452 ..... N86-24772 #
AD-A163453 ..... N86-25127 #
AD-A163457 ..... N86-24911 #
AD-A163459 ..... N86-25210 #
AD-A163461 ..... N86-25056 #
AD-A163465 ..... N86-24773 #
AD-A163469 ..... N86-24820 #
AD-A163472 ..... N86-24857 #
AD-A163477 ..... N86-25020 #
AD-A163478 ..... N86-25118 #
AD-A163485 ..... N86-25271 #
AD-A163494 ..... N86-24821 #
AD-A163501 ..... N86-24912 #
AD-A163517 ..... N86-25021 #
AD-A163524 ..... N86-25128 #
AD-A163527 ..... N86-24847 #
AD-A163528 ..... N86-24882 #
AD-A163529 ..... N86-24979 #
AD-A163530 ..... N86-25163 #
AD-A163534 ..... N86-24723 #
AD-A163537 ..... N86-25272 #
AD-A163541 ..... N86-24680 #
AD-A163542 ..... N86-24688 #
AD-A163543 ..... N86-24848 #
AD-A163551 ..... N86-24939 #
AD-A163552 ..... N86-24995 #
AD-A163556 ..... N86-25147 #
AD-A163559 ..... N86-25273 #
AD-A163561 ..... N86-24883 #
AD-A163564 ..... N86-25148 #
AD-A163566 ..... N86-25182 #
AD-A163567 ..... N86-25238 #
AD-A163569 ..... N86-24762 #
AD-A163572 ..... N86-24870 #
AD-A163573 ..... N86-25274 #
AD-A163574 ..... N86-25275 #
AD-A163582 ..... N86-24774 #
AD-A163584 ..... N86-24940 #
AD-A163586 ..... N86-25224 #
AD-A163587 ..... N86-25129 #
AD-A163590 ..... N86-24858 #
AD-A163591 ..... N86-25101 #
AD-A163592 ..... N86-25276 #
AD-A163598 ..... N86-24871 #
AD-A163600 ..... N86-24941 #
AD-A163601 ..... N86-25203 #
AD-A163603 ..... N86-25047 #
AD-A163604 ..... N86-25262 #
AD-A163605 ..... N86-25183 #
AD-A163608 ..... N86-24654 #
AD-A163610 ..... N86-25184 #
AD-A163611 ..... N86-25185 #
AD-A163612 ..... N86-24942 #
AD-A163615 ..... N86-24996 #
AD-A163618 ..... N86-25170 #
AD-A163619 ..... N86-24980 #
AD-A163625 ..... N86-25209 #
AD-A163626 ..... N86-25186 #
AD-A163627 ..... N86-25187 #
AD-A163628 ..... N86-25188 #
AD-A163629 ..... N86-25239 #
AD-A163644 ..... N86-25102 #
AD-A163647 ..... N86-25048 #
AD-A163650 ..... N86-25221 #
AD-A163654 ..... N86-25071 #
AD-A163666 ..... N86-24775 #
AD-A163670 ..... N86-24822 #
AD-A163671 ..... N86-24823 #
AD-A163672 ..... N86-24824 #
AD-A163674 ..... N86-25293 #
AD-A163675 ..... N86-25294 #
AD-A163685 ..... N86-25119 #
AD-A163688 ..... N86-24884 #
AD-A163689 ..... N86-25130 #
AD-A163690 ..... N86-24825 #
AD-A163691 ..... N86-24859 #
AD-A163692 ..... N86-24668 #
AD-A163693 ..... N86-25057 #
AD-A163694 ..... N86-24860 #
AD-A163695 ..... N86-24885 #
AD-A163696 ..... N86-24849 #
AD-A163701 ..... N86-25189 #
AD-A163703 ..... N86-24943 #
AD-A163704 ..... N86-25081 #
AD-A163705 ..... N86-25190 #
AD-A163713 ..... N86-24861 #
AD-A163714 ..... N86-25191 #
AD-A163715 ..... N86-25211 #
AD-A163716 ..... N86-25072 #
AD-A163722 ..... N86-24681 #
AD-A163724 ..... N86-24862 #
AD-A163725 ..... N86-24913 #
AD-A163735 ..... N86-25277 #
AD-A163736 ..... N86-24669 #
AD-A163737 ..... N86-24776 #
AD-A163745 ..... N86-24886 #
AD-A163746 ..... N86-25240 #
AD-A163751 ..... N86-24777 #
AD-A163752 ..... N86-25022 #
AD-A163779 ..... N86-25023 #
AD-A163781 ..... N86-25049 #
AD-A163782 ..... N86-24887 #
AD-A163783 ..... N86-25204 #
AD-A163784 ..... N86-24914 #
AD-A163809 ..... N86-25241 #
AD-A163810 ..... N86-24850 #
AD-A163812 ..... N86-25082 #
AD-A163815 ..... N86-24851 #
AD-A163819 ..... N86-25083 #
AD-A163821 ..... N86-25084 #
AD-A163822 ..... N86-25225 #
AD-A163825 ..... N86-24888 #
AD-A163826 ..... N86-24889 #
AD-A163828 ..... N86-25149 #
AD-A163829 ..... N86-24997 #
AD-A163830 ..... N86-24890 #
AD-A163831 ..... N86-25192 #
AD-A163832 ..... N86-25005 #
AD-A163833 ..... N86-25205 #
AD-A163837 ..... N86-25193 #
AD-A163838 ..... N86-25212 #
AD-A163839 ..... N86-25226 #
AD-A163840 ..... N86-25194 #
AD-A163841 ..... N86-25195 #
AD-A163842 ..... N86-25150 #
AD-A163843 ..... N86-25295 #
AD-A163844 ..... N86-25151 #
AD-A163860 ..... N86-24981 #
AD-A163865 ..... N86-25123 #
AD-A163867 ..... N86-24968 #
AD-A163877 ..... N86-24705 #
AD-A163878 ..... N86-25024 #
AD-A163879 ..... N86-25242 #
AD-A163881 ..... N86-25227 #
AD-A163882 ..... N86-24915 #
AD-A163887 ..... N86-24715 #
AD-A163890 ..... N86-25085 #
AD-A163891 ..... N86-25006 #
AD-A163892 ..... N86-25120 #
AD-A163893 ..... N86-25124 #
AD-A163894 ..... N86-25125 #
AD-A163896 ..... N86-24891 #
AD-A163897 ..... N86-25103 #
AD-A163900 ..... N86-25007 #
AD-A163901 ..... N86-24982 #
AD-A163902 ..... N86-25312 #
AD-A163903 ..... N86-24916 #
AD-A163905 ..... N86-25131 #
AD-A163906 ..... N86-24852 #
AD-A163907 ..... N86-25110 #
AD-A163919 ..... N86-24778 #
AD-A163920 ..... N86-25206 #
AD-A163921 ..... N86-25196 #
AD-A163940 ..... N86-25152 #
AD-A163941 ..... N86-24892 #
AD-A163942 ..... N86-24983 #
AD-A163943 ..... N86-24917 #
AD-A163946 ..... N86-24779 #
AD-A163947 ..... N86-25171 #
AD-A163960 ..... N86-24738 #
AD-A163961 ..... N86-24945 #
AD-A163962 ..... N86-24670 #
AD-A163963 ..... N86-25132 #
AD-A163965 ..... N86-24896 #
AD-A163966 ..... N86-25164 #
AD-A163970 ..... N86-24998 #
AD-A163972 ..... N86-25153 #
AD-A163974 ..... N86-24946 #
AD-A163975 ..... N86-24739 #
AD-A163976 ..... N86-25313 #
AD-A163982 ..... N86-25025 #
AD-A163983 ..... N86-24752 #
AD-A163984 ..... N86-24920 #
AD-A163986 ..... N86-25154 #
AD-A163987 ..... N86-25222 #
AD-A163988 ..... N86-24716 #
AD-A163989 ..... N86-24717 #
AD-A163990 ..... N86-24782 #
AD-A163992 ..... N86-24947 #
AD-A163993 ..... N86-25008 #
AD-A164010 ..... N86-24855 #
AD-A164011 ..... N86-25113 #
AD-A164013 ..... N86-25296 #
AD-A164014 ..... N86-24971 #
AD-A164016 ..... N86-24740 #
AD-A164017 ..... N86-24706 #
AD-A164018 ..... N86-25026 #
AD-A164019 ..... N86-24724 #
AD-A164020 ..... N86-25198 #
AD-A164021 ..... N86-24725 #
AD-A164022 ..... N86-25155 #
AD-A164024 ..... N86-25075 #
AD-A164025 ..... N86-25199 #
AD-A164034 ..... N86-25200 #
AD-A164035 ..... N86-24897 #
AD-A164036 ..... N86-24682 #
AD-A164037 ..... N86-25133 #
AD-A164038 ..... N86-24948 #
AD-A164039 ..... N86-24741 #
AD-A164040 ..... N86-24763 #
AD-A164041 ..... N86-25235 #
AD-A164042 ..... N86-25134 #
AD-A164043 ..... N86-24921 #
AD-A164044 ..... N86-25156 #
AD-A164101 ..... N86-24949 #

AD-A164103 ..... N86-24922 #
AD-A164104 ..... N86-24690 #
AD-A164105 ..... N86-24727 #
AD-A164106 ..... N86-24898 #
AD-A164107 ..... N86-25213 #
AD-A164108 ..... N86-24707 #
AD-A164109 ..... N86-24923 #
AD-A164111 ..... N86-24708 #
AD-A164112 ..... N86-25157 #
AD-A164129 ..... N86-25297 #
AD-A164130 ..... N86-24856 #
AD-A164136 ..... N86-24764 #
AD-A164139 ..... N86-24683 #
AD-A164142 ..... N86-24950 #
AD-A164143 ..... N86-25135 #
AD-A164144 ..... N86-25158 #
AD-A164147 ..... N86-25231 #
AD-A164149 ..... N86-24972 #
AD-A164150 ..... N86-24728 #
AD-A164151 ..... N86-24924 #
AD-A164152 ..... N86-25136 #
AD-A164154 ..... N86-24783 #
AD-A164155 ..... N86-24951 #
AD-A164156 ..... N86-24784 #
AD-A164158 ..... N86-24827 #
AD-A164159 ..... N86-25232 #
AD-A164163 ..... N86-24753 #
AD-A164164 ..... N86-24765 #
AD-A164166 ..... N86-24985 #
AD-A164167 ..... N86-24986 #
AD-A164169 ..... N86-25165 #
AD-A164170 ..... N86-25086 #
AD-A164171 ..... N86-25137 #
AD-A164172 ..... N86-24674 #
AD-A164176 ..... N86-24899 #
AD-A164177 ..... N86-24684 #
AD-A164178 ..... N86-25052 #
AD-A164179 ..... N86-25244 #
AD-A164180 ..... N86-25138 #
AD-A164181 ..... N86-25159 #
AD-A164182 ..... N86-25298 #
AD-A164183 ..... N86-24766 #
AD-A164187 ..... N86-25087 #
AD-A164188 ..... N86-24828 #
AD-A164189 ..... N86-25245 #
AD-A164190 ..... N86-25027 #
AD-A164191 ..... N86-24767 #
AD-A164195 ..... N86-24925 #
AD-A164196 ..... N86-25300 #
AD-A164199 ..... N86-24900 #
AD-A164200 ..... N86-24901 #
AD-A164202 ..... N86-24999 #
AD-A164204 ..... N86-25208 #
AD-A164205 ..... N86-24926 #
AD-A164209 ..... N86-25174 #
AD-A164210 ..... N86-25114 #
AD-A164211 ..... N86-24927 #
AD-A164213 ..... N86-25246 #
AD-A164214 ..... N86-24699 #
AD-A164217 ..... N86-24864 #
AD-A164227 ..... N86-24952 #
AD-A164228 ..... N86-25247 #
AD-A164229 ..... N86-24829 #
AD-A164240 ..... N86-24742 #
AD-A164241 ..... N86-24830 #
AD-A164258 ..... N86-25115 #
AD-A164259 ..... N86-25279 #

AD-B157859 ..... N86-25004 #

AD-D011965 ..... N86-25243
AD-D011966 ..... N86-25050
AD-D011967 ..... N86-24969 #
AD-D011968 ..... N86-24893 #
AD-D011971 ..... N86-24853
AD-D012003 ..... N86-24698
AD-D012017 ..... N86-24984
AD-D012019 ..... N86-24854
AD-D012020 ..... N86-24826
AD-D012153 ..... N86-24918 #
AD-D012154 ..... N86-24780 #
AD-D012155 ..... N86-24689 #
AD-D012156 ..... N86-24944 #
AD-D012157 ..... N86-24919 #

AD-E401440 ..... N86-24771 #
AD-E401440 ..... N86-24772 #
AD-E401440 ..... N86-24773 #
AD-E401440 ..... N86-24911 #
AD-E401440 ..... N86-25056 #
AD-E401440 ..... N86-25127 #
AD-E401440 ..... N86-25210 #
AD-E401440 ..... N86-25270 #
AD-E750890 ..... N86-24674 #
AD-E750890 ..... N86-24985 #
AD-E750890 ..... N86-24986 #
AD-E750890 ..... N86-25086 #
AD-E750890 ..... N86-25137 #
AD-E750890 ..... N86-25165 #

AERE-R-11266 ..... N86-24833
AERE-R-11723 ..... N86-25266
AERE-R-11763 ..... N86-25280 #

AESC-7855 ..... N86-25275 #

AFESC/ESL-TR-85-27 ..... N86-25048 #

AFIT/DS/AA/85-1 ..... N86-24782 #

AFIT/DS/ENG/85D-1 ..... N86-24999 #

AFIT/GA/AA/85D-4 ..... N86-24948 #
AFIT/GA/AA/85D-5 ..... N86-24717 #
AFIT/GA/AA/85D-6 ..... N86-25026 #
AFIT/GA/AA/85D-7 ..... N86-25198 #
AFIT/GA/AA/85D-01 ..... N86-24724 #
AFIT/GA/AA/85D-10 ..... N86-24725 #
AFIT/GA/AA/85S-1 ..... N86-24763 #

AFIT/GA/GE/ENG/85D-33 ..... N86-24682 #

AFIT/GAE/AA/85D-2 ..... N86-24699 #
AFIT/GAE/AA/85D-5 ..... N86-24739 #
AFIT/GAE/AA/85D-7 ..... N86-24947 #
AFIT/GAE/AA/85D-10 ..... N86-24738 #
AFIT/GAE/AA/85D-11 ..... N86-24945 #
AFIT/GAE/AA/85D-13 ..... N86-24690 #
AFIT/GAE/AA/85D-14 ..... N86-24705 #
AFIT/GAE/AA/85D-15 ..... N86-25024 #
AFIT/GAE/AA/85D-17 ..... N86-24946 #
AFIT/GAE/AA/85D-18 ..... N86-24949 #
AFIT/GAE/AA/85J-3 ..... N86-24670 #

AFIT/GAE/ENG/85D-1 ..... N86-24708 #
AFIT/GAE/ENG/85D-2 ..... N86-24890 #

AFIT/GAE/ENY/84D-11 ..... N86-24727 #

AFIT/GAE/MA/85D-1 ..... N86-25235 #

AFIT/GCS/EE/85D-14 ..... N86-25297 #

AFIT/GCS/ENG/85D-7 ..... N86-25296 #
AFIT/GCS/ENG/85D-11 ..... N86-24923 #
AFIT/GCS/ENG/85D-12 ..... N86-25171 #
AFIT/GCS/ENG/85D-24 ..... N86-25295 #
AFIT/GCS/ENG/85S-2 ..... N86-24899 #

AFIT/GCS/MA/85D-2 ..... N86-25150 #
AFIT/GCS/MA/85D-5 ..... N86-25131 #
AFIT/GCS/MA/85D-6 ..... N86-25151 #

AFIT/GE/EE/85D-38 ..... N86-24706 #

AFIT/GE/ENG/85-D-46-VOL-2 ..... N86-25156 #
AFIT/GE/ENG/85D-2 ..... N86-25200 #
AFIT/GE/ENG/85D-3 ..... N86-25246 #
AFIT/GE/ENG/85D-4 ..... N86-24971 #
AFIT/GE/ENG/85D-7 ..... N86-24997 #
AFIT/GE/ENG/85D-10 ..... N86-25174 #
AFIT/GE/ENG/85D-11 ..... N86-24917 #
AFIT/GE/ENG/85D-13 ..... N86-25164 #
AFIT/GE/ENG/85D-14 ..... N86-24740 #
AFIT/GE/ENG/85D-16 ..... N86-24898 #
AFIT/GE/ENG/85D-20 ..... N86-24926 #
AFIT/GE/ENG/85D-21 ..... N86-24707 #
AFIT/GE/ENG/85D-23 ..... N86-24888 #
AFIT/GE/ENG/85D-25 ..... N86-25213 #
AFIT/GE/ENG/85D-26 ..... N86-24891 #
AFIT/GE/ENG/85D-35 ..... N86-24921 #
AFIT/GE/ENG/85D-36 ..... N86-25133 #
AFIT/GE/ENG/85D-40 ..... N86-24896 #
AFIT/GE/ENG/85D-44 ..... N86-24983 #
AFIT/GE/ENG/85D-46-VOL-1 ..... N86-25152 #
AFIT/GE/ENG/85D-47 ..... N86-25132 #
AFIT/GE/ENG/85D-49 ..... N86-24892 #
AFIT/GE/ENG/85D-51 ..... N86-24889 #
AFIT/GE/ENG/85D-52-VOL-2 ..... N86-25134 #
AFIT/GE/ENG/85D-53 ..... N86-25149 #
AFIT/GE/ENG/85S-1 ..... N86-24897 #

AFIT/GEO/ENG/85D-1 ..... N86-24922 #

AFIT/GEO/ENP/85D-2 ..... N86-25158 #
AFIT/GEO/ENP/85D-4 ..... N86-24779 #

AFIT/GEP/PH/84D-12 ..... N86-25212 #
AFIT/GEP/PH/84D-13 ..... N86-25226 #

AFIT/GOR/MA/85D-1 ..... N86-25195 #
AFIT/GOR/MA/85D-2 ..... N86-25194 #

AFIT/GSO/AA/85D-1 ..... N86-25313 #

AFIT/GSO/ENY/85D-2 ..... N86-24741 #

AFIT/GSO/MA/85D-1 ..... N86-25008 #
AFIT/GSO/MA/85D-2 ..... N86-25005 #
AFIT/GSO/MA/85D-3 ..... N86-25192 #
AFIT/GSO/MA/85D-5 ..... N86-25208 #
AFIT/GSO/MA/85D-6 ..... N86-25193 #
AFIT/GSO/MA/85D-7 ..... N86-25205 #

AFOSR-85-1109TR ..... N86-25197 #
AFOSR-85-1133TR ..... N86-25228 #
AFOSR-85-1216TR ..... N86-25157 #
AFOSR-85-1218TR ..... N86-25245 #
AFOSR-85-1222TR ..... N86-24828 #
AFOSR-85-1224TR ..... N86-24767 #
AFOSR-85-1226TR ..... N86-24765 #
AFOSR-85-1241TR ..... N86-24742 #
AFOSR-85-1258TR ..... N86-24827 #
AFOSR-85-1259TR ..... N86-25155 #
AFOSR-86-0003TR ..... N86-24855 #
AFOSR-86-0029TR ..... N86-24753 #
AFOSR-86-0030TR ..... N86-25231 #
AFOSR-86-0039TR ..... N86-24927 #

AFRPL-TR-85-068 ..... N86-24752 #

AFWAL-TR-84-2001-PT-2 ..... N86-24849 #
AFWAL-TR-85-2054 ..... N86-24781 #
AFWAL-TR-85-2072 ..... N86-24688 #
AFWAL-TR-85-3066-VOL-1 ..... N86-25147 #
AFWAL-TR-85-4096 ..... N86-24821 #

AFWL-TR-85-82 ..... N86-24968 #

AGARD-AR-182(FR) ..... N86-24692 #
AGARD-AR-218 ..... N86-24903 #

AGARD-BULL-86/1 ..... N86-25285 #

AGARD-R-721 ..... N86-24994 #

AIAA-PAPER-86-0863 ..... N86-24663* #

AIAA-86-0862 ..... N86-24657* #
AIAA-86-1627 ..... N86-24658* #
AIAA-86-1703 ..... N86-24749* #

AR-4 ..... N86-25299 #

ARAED-TR-85007 ..... N86-24773 #

ARE/TM-(N1)-86501 ..... N86-25022 #

ARO-16472.7-EL ..... N86-24916 #
ARO-17684.3-EL ..... N86-25277 #
ARO-18141.2-MS ..... N86-24850 #
ARO-18197.7-MA ..... N86-25154 #
ARO-18203.5-PH ..... N86-25241 #
ARO-18576.15-MA ..... N86-25025 #
ARO-19016.14-LS ..... N86-25115 #
ARO-19065.16-MA ..... N86-25120 #
ARO-19236.10-MA ..... N86-25153 #
ARO-19253.1-PH ..... N86-25242 #
ARO-19294.3-CH ..... N86-25227 #
ARO-19300.4-EL ..... N86-24916 #
ARO-19328.1-CH ..... N86-24777 #
ARO-19367.32-MA ..... N86-25006 #
ARO-19367.33-MA ..... N86-25204 #
ARO-19434.9-EG ..... N86-24776 #
ARO-19612.1-GS-H ..... N86-25085 #
ARO-19630.5-GS ..... N86-25083 #
ARO-19708.7-MS ..... N86-24852 #
ARO-19990.6-MS ..... N86-24856 #
ARO-20117.4-PH ..... N86-24982 #
ARO-20218.2-GS ..... N86-25087 #
ARO-20519.17-EL ..... N86-24716 #
ARO-20979.6-CH ..... N86-24775 #
ARO-21378.3-EL ..... N86-24887 #
ARO-21756.1-PH ..... N86-25075 #
ARO-21933.1-PH-RI ..... N86-24981 #
ARO-22362.1-EG ..... N86-24669 #
ARO-22454.1-PH-S ..... N86-24914 #
ARO-23141.1-MS ..... N86-25225 #

ASC-R-147 ..... N86-25287 #

ATR-1 ..... N86-25228 #
ATR-85(8463)-2 ..... N86-24894 #

AVSCOM-TM-86-B-1 ..... N86-24665* #

B-216229 ..... N86-24743 #
B-216946 ..... N86-25288 #

BBC-RD-1986/1 ..... N86-24976
BBC-RD-1986/2 ..... N86-24874

BBN-6097 ..... N86-25172 #

BFLRF-199 ..... N86-24858 #
BFLRF-203 ..... N86-24847 #

BLL-M-36623-(5828.4) N86-25262
BLL-M-36626-(5828.4) N86-24805
BLL-M-36627-(5828.4) N86-25013
BLL-M-36630-(5828.4) N86-24804
BLL-M-36639-(5828.4) N86-24791
BLL-M-36642-(5828.4) N86-25015
BLL-M-36643-(5828.4) N86-24812
BLL-M-36644-(5828.4) N86-24811
BLL-M-36645-(5828.4) N86-24810
BLL-M-36646-(5828.4) N86-24809
BLL-M-36647-(5828.4) N86-24808
BLL-M-36651-(5828.4) N86-25014
BLL-M-36671-(5828.4) N86-24656
BLL-M-36677-(5828.4) N86-24796
BLL-M-36689-(5828.4) N86-24792
BLL-M-36690-(5828.4) N86-24793
BLL-M-36691-(5828.4) N86-24794
BLL-M-36692-(5828.4) N86-24754
BLL-M-36693-(5828.4) N86-24795

BLL-RISLEY-TR-5278-(9091.9F) N86-25010
BLL-RISLEY-TR-5279-(9091.9F) N86-25011
BLL-RISLEY-TR-5280-(9091.9F) N86-25009
BLL-RISLEY-TR-5284-(9091.9F) N86-25016

BLL-36604-SER-M-5828.4 ..... N86-24790

BLLD-5828.4-M-36625 ..... N86-24806
BLLD-5828.4-M-36638 ..... N86-24803
BLLD-5828.4-M-36646 ..... N86-24807
BLLD-5828.4-M-36658 ..... N86-24797
BLLD-5828.4-M-36663 ..... N86-24798
BLLD-5828.4-M-36664 ..... N86-24799
BLLD-5828.4-M-36665 ..... N86-25012
BLLD-5828.4-M-36666 ..... N86-24800
BLLD-5828.4-M-36668 ..... N86-24801
BLLD-5828.4-M-36669 ..... N86-24802

BMI-2130 ..... N86-25067 #

BNL-37376 ..... N86-24852 #

BRL-CR-548 ..... N86-24952 #

BRL-IMR-831 ..... N86-24951 #

BRL-MR-3486 ..... N86-24857 #
BRL-MR-3491 ..... N86-24951 #

BRL-TR-2692 ..... N86-24783 #
BRL-TR-2697 ..... N86-25196 #
BRL-TR-2699 ..... N86-24728 #
BRL-TR-2701 ..... N86-24778 #
BRL-TR-2705 ..... N86-25206 #
BRL-TR-2706 ..... N86-24784 #

CAR-TR-158 ..... N86-25245 #
CAR-TR-159 ..... N86-25157 #

CAR-8601 ..... N86-24666 #
CAR-8612 ..... N86-25286 #
CAR-8614 ..... N86-24679 #

CETS-CND-024 ..... N86-25089 #

CHES/NAVFAC-FPO-1-77(3) ..... N86-25056 #

COE-279 ..... N86-25105 #

CONF-850887-14 ..... N86-25248 #
CONF-850887-38 ..... N86-24831 #
CONF-8505130-9 ..... N86-25283 #
CONF-8509168-3 ..... N86-24832 #
CONF-8510153-1 ..... N86-25029 #
CONF-8510160-8 ..... N86-24819 #
CONF-8510222-1 ..... N86-25036 #
CONF-8510237-1 ..... N86-25028 #

CRDC-TR-84131 ..... N86-24863 #

CRJP-255A ..... N86-25119 #

CS-TR-1569 ..... N86-25245 #
CS-TR-1573 ..... N86-25157 #

CSDL-R-1829 ..... N86-24998 #
CSDL-R-1849 ..... N86-24678* #

CSLI-85-39 ..... N86-25172 #

CU-CS-313-85 ..... N86-25154 #

DAR-TP-11 ..... N86-25055 #

DCIEM-85-R-49 ..... N86-25113 #
DCIEM-85-R-51 ..... N86-25114 #

DE85-014242 ..... N86-25035 #
DE85-014754 ..... N86-25263 #
DE85-015728 ..... N86-25248 #
DE85-017799 ..... N86-25058 #
DE85-018396 ..... N86-24831 #
DE86-001978 ..... N86-25283 #
DE86-002101 ..... N86-25036 #
DE86-002234 ..... N86-25053 #
DE86-002265 ..... N86-25234 #
DE86-002292 ..... N86-25160 #
DE86-002670 ..... N86-25233 #
DE86-002691 ..... N86-24832 #
DE86-002908 ..... N86-25264 #
DE86-002916 ..... N86-24819 #
DE86-002921 ..... N86-24785 #
DE86-004128 ..... N86-25028 #
DE86-004360 ..... N86-24954 #
DE86-004361 ..... N86-25161 #
DE86-004368 ..... N86-25059 #
DE86-004369 ..... N86-24953 #

DGLR-PAPER-84-127 ..... N86-24710* #

DOE/ER-02853/24 ..... N86-25234 #
DOE/ER-10376/T8 ..... N86-25264 #

DOE/ET-51013/153 ..... N86-25263 #

DOE/JPL-1012-113 ..... N86-25045* #
DOE/JPL-1012-123 ..... N86-25043* #
DOE/JPL-1060-90 ..... N86-25044* #

DOE/NASA-0307/1 ..... N86-24845* #
DOE/NASA-50112/62-REV ..... N86-25303* #

DOE/NASA/0289-1 ..... N86-25040* #
DOE/NASA/0351-1 ..... N86-25302* #
DOE/NASA/4148-1 ..... N86-24846 #

DOE/OR-21400/T204 ..... N86-25053 #

DOE/PC-50800/T12 ..... N86-24785 #

DOT-CG-N-1-86 ..... N86-24683 #

DOT-TSC-CG-85-4 ..... N86-24683 #

DOT-TSC-FAA-85-4 ..... N86-24680 #

DOT/FAA/CT-TN85/63 ..... N86-24681 #

DOT/FAA/CT-85/37 ..... N86-25079 #

DRIC-BR-97684 ..... N86-25023 #
DRIC-BR-98168 ..... N86-24886 #
DRIC-BR-98230 ..... N86-25022 #
DRIC-BR-98309 ..... N86-25240 #

DTNSRDC/CMLD-85/13 ..... N86-25128 #

DTNSRDC/SME-85/62 ..... N86-24998 #

DU/DC/TR-01 ..... N86-25271 #

D6-53071 ..... N86-24659* #

E-2328-1 ..... N86-24839* #
E-2647 ..... N86-24835* #
E-2680 ..... N86-25284* #
E-2713 ..... N86-25218* #
E-2758 ..... N86-24837* #
E-2757 ..... N86-24934* #
E-2762 ..... N86-24722* #
E-2771 ..... N86-24694* #
E-2780 ..... N86-24757* #
E-2782 ..... N86-24759* #
E-2801 ..... N86-24992* #
E-2839-1 ..... N86-24959* #
E-2888 ..... N86-24813* #
E-2889 ..... N86-24990* #
E-2891 ..... N86-24838* #
E-2896 ..... N86-25303* #
E-2908 ..... N86-25039* #
E-2916 ..... N86-24964* #
E-2918 ..... N86-25267* #
E-2921 ..... N86-24836* #
E-2926 ..... N86-24907* #
E-2929 ..... N86-24869* #
E-2949 ..... N86-25002* #
E-2950 ..... N86-25268* #
E-2976 ..... N86-24881* #
E-2981 ..... N86-24748* #
E-2986 ..... N86-24749* #
E-2987 ..... N86-24961* #
E-2995 ..... N86-24697* #
E-2998 ..... N86-24756* #
E-3004 ..... N86-24658* #
E-3013 ..... N86-24667* #
E-3020 ..... N86-25217* #
E-3029 ..... N86-24958* #
E-3035 ..... N86-24917 #
E-3044 ..... N86-25321* #
E-3045 ..... N86-24747* #
E-3049 ..... N86-24691* #
E-3058 ..... N86-24967* #

EGG-M-25885 ..... N86-25028 #

EGG-10282-1096 ..... N86-25036 #

EPA-600/D-85-222 ..... N86-25068 #
EPA-600/D-85-231 ..... N86-25077 #
EPA-600/D-85-280 ..... N86-25062 #
EPA-600/D-85/272 ..... N86-24865 #
EPA-600/D-86-002 ..... N86-25060 #
EPA-600/1-85-013 ..... N86-25116 #

ERADCOM/ASL-TR-0181 ..... N86-25081 #

ERIM-155700-18-F ..... N86-25241 #

ERL-238 ..... N86-25032 #

ESD-TR-85-240 ..... N86-24920 #
ESD-TR-85-263 ..... N86-25312 #

ESL-710816-19 ..... N86-24924 #
ESL-716559-2 ..... N86-24882 #

ESN-40-3 ..... N86-25298 #

ETL-0411 ..... N86-25293 #

ETS-76 ..... N86-25312 #

FAA-AC-25.939-1 ..... N86-24696 #

FAA/ES-85/4 ..... N86-24680 #

FDA-81-11 ..... N86-24995 #

FHWA/CA/TL-85/02 ..... N86-24834 #

FHWA/FL/BMR-85/291 ..... N86-24973 #

FR-170 ..... N86-25163 #

FSU-STATISTICS-M709 ..... N86-25006 #
FSU-STATISTICS-M710 ..... N86-25204 #

FTD-ID(RS)T-0010-86 ..... N86-24884 #
FTD-ID(RS)T-0036-86 ..... N86-25130 #
FTD-ID(RS)T-0173-85 ..... N86-24654 #
FTD-ID(RS)T-0905-85 ..... N86-24859 #
FTD-ID(RS)T-0913-85 ..... N86-24861 #
FTD-ID(RS)T-0927-85 ..... N86-24825 #
FTD-ID(RS)T-0964-85 ..... N86-24860 #
FTD-ID(RS)T-1029-85 ..... N86-24715 #
FTD-ID(RS)T-1041-85 ..... N86-24666 #
FTD-ID(RS)T-1176-85 ..... N86-24885 #
FTD-ID(RS)T-1228-85 ..... N86-24911 #

FWS-OBS-85(7.1) ..... N86-25068 #

GAO/NSIAD-86-3 ..... N86-25288 #

GAO/RCED-86-28 ..... N86-24743 #

GARRETT-21-5418 ..... N86-24938* #

GPO-52-283 ..... N86-25301 #

GRI-85/0190 ..... N86-25054 #

H-86-05 ..... N86-25121* #
H-1264 ..... N86-25166* #
H-1325 ..... N86-25160* #
H-1364 ..... N86-24667* #

HAC-FR84-16-446-REV-B ..... N86-25007 #

HIG-84-3 ..... N86-25104 #

ICASE-86-15 ..... N86-25176* #
ICASE-86-16 ..... N86-25167* #

INPE-3787-PRE/882 ..... N86-25304 #
INPE-3788-PRE/883 ..... N86-25178 #
INPE-3790-PRE/885 ..... N86-25202 #
INPE-3796-PRE/891 ..... N86-25179 #
INPE-3797-PRE/892 ..... N86-25317 #
INPE-3809-PRE/895 ..... N86-25316* #
INPE-3810-PRE/896 ..... N86-25257 #

IPPJ-755 ..... N86-25256 #
IPPJ-756 ..... N86-25251 #
IPPJ-757 ..... N86-25252 #
IPPJ-758 ..... N86-25250 #
IPPJ-759 ..... N86-25249 #
IPPJ-760 ..... N86-25253 #
IPPJ-761 ..... N86-25254 #
IPPJ-762 ..... N86-25255 #
IPPJ-766 ..... N86-25261 #
IPPJ-767 ..... N86-25260 #
IPPJ-768 ..... N86-25259 #
IPPJ-769-VOL-1 ..... N86-25258 #

IR-2 ..... N86-24887 #
IR-5 ..... N86-25270 #

ISA(WC)-107-VOL-1 ..... N86-24822 #
ISA(WC)-107-VOL-2 ..... N86-24823 #
ISA(WC)-107-VOL-3 ..... N86-24824 #

ISBN-0-643-04018-8 ..... N86-25055 #
ISBN-0-947767-34-7 ..... N86-24666 #
ISBN-0-947767-37-1 ..... N86-25286 #
ISBN-0-947767-39-8 ..... N86-24679 #
ISBN-92-835-1512-9 ..... N86-24994 #
ISBN-92-835-1514-7 ..... N86-24903 #
ISBN-92-835-2110-2 ..... N86-24692 #

ISI-63 ..... N86-24742 #

ISSN-0578-7904 ..... N86-24815* #
ISSN-0800-4412 ..... N86-25112 #

JIMAR-84-0085 ..... N86-25104 #

JPL-PUBL-85-56 ..... N86-25044* #
JPL-PUBL-85-86 ..... N86-25045* #
JPL-PUBL-86-5 ..... N86-25034* #
JPL-PUBL-86-17 ..... N86-25043* #

KES.U.85.5 ..... N86-25155 #

L-15937 ..... N86-25220* #
L-16014 ..... N86-24672* #
L-16042 ..... N86-25168* #
L-16065 ..... N86-24685* #
L-16066 ..... N86-24662* #
L-16078 ..... N86-24665* #
L-16099 ..... N86-24709* #
L-16103 ..... N86-24962* #

LA-UR-85-2743 ..... N86-25248 #

LA-10409-HDR ..... N86-25035 #
LA-10487-MS ..... N86-24954 #
LA-10521-MS ..... N86-25161 #
LA-10546-PR ..... N86-25059 #
LA-10564-MS ..... N86-24953 #

LBL-19947 ..... N86-24832 #
LBL-20059 ..... N86-25283 #
LBL-20324 ..... N86-25233 #

LC-84-601115 ..... N86-25099 #
LC-85-600599 ..... N86-25162 #
LC-85-600600 ..... N86-25140 #

LMSC-HEC-TR-D065122 ..... N86-24719* #

MCR-85-721 ..... N86-24762 #

MIT/LCS/TM-290 ..... N86-24716 #

MM-85-1 ..... N86-24914 #
MM-5022-85-5 ..... N86-24767 #
MM-5034-85-8 ..... N86-24765 #

MR-1 ..... N86-24905* #

MRC-TSR-2867 ..... N86-25183 #
MRC-TSR-2870 ..... N86-25203 #
MRC-TSR-2874 ..... N86-25191 #
MRC-TSR-2875 ..... N86-25189 #
MRC-TSR-2876 ..... N86-25190 #
MRC-TSR-2879 ..... N86-25209 #
MRC-TSR-2883 ..... N86-24941 #
MRC-TSR-2885 ..... N86-24942 #
MRC-TSR-2888 ..... N86-25187 #
MRC-TSR-2889 ..... N86-25186 #
MRC-TSR-2890 ..... N86-25188 #
MRC-TSR-2894 ..... N86-25211 #
MRC-TSR-2895 ..... N86-24943 #

MTL-TR-85-37 ..... N86-24766 #

MTR-85-556-VOL-2 ..... N86-24876* #

NAL-TM-ST-8514 ..... N86-25180 #

NAPC-PE-137C ..... N86-24858 #

NAS 1.15:77855 ..... N86-24816* #
NAS 1.15:77908 ..... N86-24736* #
NAS 1.15:77948 ..... N86-25146 #
NAS 1.15:83102 ..... N86-25122* #
NAS 1.15:83199 ..... N86-25220* #
NAS 1.15:85912 ..... N86-25166* #
NAS 1.15:86081 ..... N86-25018* #
NAS 1.15:86240 ..... N86-25030* #
NAS 1.15:86541 ..... N86-24937* #
NAS 1.15:86543 ..... N86-25305* #
NAS 1.15:86544 ..... N86-24758* #
NAS 1.15:86864-REV ..... N86-24839* #
NAS 1.15:87090 ..... N86-25284* #
NAS 1.15:87112 ..... N86-25218* #
NAS 1.15:87154 ..... N86-24757* #
NAS 1.15:87220 ..... N86-24934* #
NAS 1.15:87227 ..... N86-25303* #
NAS 1.15:87241 ..... N86-24964* #
NAS 1.15:87242 ..... N86-24835* #
NAS 1.15:87243 ..... N86-24836* #
NAS 1.15:87246 ..... N86-24907* #
NAS 1.15:87247 ..... N86-24869* #
NAS 1.15:87249 ..... N86-24838* #
NAS 1.15:87256 ..... N86-24959* #
NAS 1.15:87258 ..... N86-25268* #
NAS 1.15:87269 ..... N86-25267* #
NAS 1.15:87270 ..... N86-24813* #
NAS 1.15:87278 ..... N86-24748* #
NAS 1.15:87281 ..... N86-24749* #
NAS 1.15:87283 ..... N86-25039* #
NAS 1.15:87285 ..... N86-24881* #
NAS 1.15:87286 ..... N86-24961* #
NAS 1.15:87289 ..... N86-24697* #
NAS 1.15:87291 ..... N86-24756* #
NAS 1.15:87295 ..... N86-24759* #
NAS 1.15:87298 ..... N86-24658* #
NAS 1.15:87301 ..... N86-24667* #
NAS 1.15:87302 ..... N86-25217* #
NAS 1.15:87306 ..... N86-24958* #
NAS 1.15:87308 ..... N86-24837* #
NAS 1.15:87313 ..... N86-25321* #
NAS 1.15:87314 ..... N86-24747* #
NAS 1.15:87322 ..... N86-24967* #
NAS 1.15:87605 ..... N86-24686* #
NAS 1.15:87634 ..... N86-24685* #
NAS 1.15:87647 ..... N86-24737* #
NAS 1.15:87661 ..... N86-24665* #
NAS 1.15:87671 ..... N86-24672* #
NAS 1.15:87707 ..... N86-24657* #
NAS 1.15:87709 ..... N86-24744* #
NAS 1.15:87711 ..... N86-24703* #
NAS 1.15:87715 ..... N86-24731* #
NAS 1.15:87720 ..... N86-25019* #
NAS 1.15:87726 ..... N86-24663* #
NAS 1.15:88263 ..... N86-24687* #
NAS 1.15:88285 ..... N86-24936 #
NAS 1.15:88387 ..... N86-24815* #
NAS 1.15:88389 ..... N86-25177 #
NAS 1.15:88390 ..... N86-24710* #
NAS 1.15:88393 ..... N86-24770 #
NAS 1.15:88394 ..... N86-24769* #
NAS 1.15:88395 ..... N86-25237 #
NAS 1.15:88396 ..... N86-25041 #
NAS 1.15:88397 ..... N86-24844 #
NAS 1.15:88398 ..... N86-24842 #
NAS 1.15:88399 ..... N86-24910 #
NAS 1.15:88407 ..... N86-24843 #
NAS 1.15:88411 ..... N86-24701 #
NAS 1.15:88414 ..... N86-25315* #
NAS 1.15:88416 ..... N86-24868 #
NAS 1.15:88418 ..... N86-24652 #
NAS 1.15:88419 ..... N86-25000 #
NAS 1.15:88659 ..... N86-25316* #
NAS 1.15:88753 ..... N86-25320* #
NAS 1.15:88755 ..... N86-25032 #
NAS 1.19:206 ..... N86-24714* #
NAS 1.21:7011(284) N86-25111
NAS 1.21:7037(199) N86-24653
NAS 1.21:7041(49) ..... N86-25033 #
NAS 1.21:7046(13) ..... N86-24713* #
NAS 1.21:7056(01) N86-24711
NAS 1.26:3922(05) ..... N86-25109 #
NAS 1.26:3966 ..... N86-25219* #
NAS 1.26:3967 ..... N86-24990* #
NAS 1.26:3973 ..... N86-25216* #
NAS 1.26:3975 ..... N86-24659* #
NAS 1.26:3977 ..... N86-25002* #
NAS 1.26:3980 ..... N86-24660* #
NAS 1.26:3984 ..... N86-24661* #
NAS 1.26:166618 ..... N86-24704* #
NAS 1.26:166620 ..... N86-25169* #
NAS 1.26:168439 ..... N86-25100* #
NAS 1.26:174708 ..... N86-24693* #
NAS 1.26:174709 ..... N86-25040* #
NAS 1.26:174710 ..... N86-24991* #
NAS 1.26:174815 ..... N86-25046* #
NAS 1.26:174843 ..... N86-24746* #
NAS 1.26:174884 ..... N86-24938* #
NAS 1.26:174891 ..... N86-24931* #
NAS 1.26:174904 ..... N86-24878* #
NAS 1.26:174905 ..... N86-24877* #
NAS 1.26:174952 ..... N86-25003* #
NAS 1.26:174994 ..... N86-25302* #
NAS 1.26:175016 ..... N86-24875* #
NAS 1.26:175017 ..... N86-24876* #
NAS 1.26:175019 ..... N86-24846 #
NAS 1.26:175020 ..... N86-24695* #
NAS 1.26:175048 ..... N86-24818* #
NAS 1.26:175058 ..... N86-24845* #
NAS 1.26:175061 ..... N86-24760* #
NAS 1.26:175094 ..... N86-25310* #
NAS 1.26:175109 ..... N86-24691* #
NAS 1.26:175111 ..... N86-24817 #
NAS 1.26:176551 ..... N86-24761* #
NAS 1.26:176670 ..... N86-25311* #
NAS 1.26:176671 ..... N86-24965 #
NAS 1.26:176672 ..... N86-24751* #
NAS 1.26:176710 ..... N86-24905* #
NAS 1.26:176745 ..... N86-24755* #
NAS 1.26:176752 ..... N86-25078* #
NAS 1.26:176754 ..... N86-24712* #
NAS 1.26:176760 ..... N86-25142* #
NAS 1.26:176761 ..... N86-25001* #
NAS 1.26:176762 ..... N86-24730* #
NAS 1.26:176763 ..... N86-25017 #
NAS 1.26:176764 ..... N86-24933* #
NAS 1.26:176765 ..... N86-24955* #
NAS 1.26:176766 ..... N86-25069* #
NAS 1.26:176771 ..... N86-24677* #
NAS 1.26:176772 ..... N86-24932* #
NAS 1.26:176773 ..... N86-24702* #
NAS 1.26:176774 ..... N86-24906* #
NAS 1.26:176775 ..... N86-25070* #
NAS 1.26:176777 ..... N86-25042* #
NAS 1.26:177867 ..... N86-25291* #
NAS 1.26:177956 ..... N86-25215* #
NAS 1.26:178015 ..... N86-24684* #
NAS 1.26:178040 ..... N86-24745* #
NAS 1.26:178058 ..... N86-25145* #
NAS 1.26:178081 ..... N86-25176* #
NAS 1.26:178082 ..... N86-25167* #
NAS 1.26:178083 ..... N86-24678* #
NAS 1.26:178091 ..... N86-24963* #
NAS 1.26:178799 ..... N86-24957* #
NAS 1.26:178802 ..... N86-24930* #
NAS 1.26:178804 ..... N86-25143* #
NAS 1.26:178806 ..... N86-25144* #
NAS 1.26:178808 ..... N86-24750* #
NAS 1.26:178819 ..... N86-24732* #
NAS 1.26:178820 ..... N86-24733* #
NAS 1.26:178821 ..... N86-24734* #
NAS 1.26:178822 ..... N86-24735* #
NAS 1.26:178828 ..... N86-24719* #
NAS 1.26:178835 ..... N86-24720* #
NAS 1.26:178836 ..... N86-24966* #
NAS 1.26:178837 ..... N86-25121* #
NAS 1.60:2538 ..... N86-24992* #
NAS 1.60:2557 ..... N86-24694* #
NAS 1.60:2562 ..... N86-24722* #
NAS 1.60:2564 ..... N86-25168* #
NAS 1.60:2565 ..... N86-24662* #
NAS 1.60:2582 ..... N86-24962* #
NAS 1.60:2584 ..... N86-24709* #
NAS 1.61:1155 ..... N86-25307*
NAS 1.71-LAR-13237-1 ..... N86-24960* #
NAS 1.71:ARC-11631-1 ..... N86-24935* #
NAS 1.71:ARC-11633-1 ..... N86-24700* #
NAS 1.71:ARC-11634-1 ..... N86-24978* #
NAS 1.71:LAR-13100-1 ..... N86-24993* #
NAS 1.71:LAR-13113-1 ..... N86-24867* #
NAS 1.71:LAR-13292-1 ..... N86-24841* #
NAS 1.71:LAR-13306-1 ..... N86-25292* #
NAS 1.71:LAR-13403-1 ..... N86-24673* #
NAS 1.71:LAR-13407-1 ..... N86-24909* #
NAS 1.71:LAR-13448-1 ..... N86-24840* #
NAS 1.71:LAR-13455-1 ..... N86-24880* #

NAS 1.71:LAR-13474-1-SB ..... N86-24814* #
NAS 1.71:MSC-20870-1 ..... N86-24977* #
NAS 1.71:MSC-20912-1 ..... N86-24879* #
NAS 1.71:NPO-16487-1-CU ..... N86-24908* #
NAS 1.71:NPO-16584-1-CU ..... N86-25269* #

NASA-CASE-ARC-11631-1 ..... N86-24935* #
NASA-CASE-ARC-11633-1 ..... N86-24700* #
NASA-CASE-ARC-11634-1 ..... N86-24978* #

NASA-CASE-LAR-13100-1 ..... N86-24993* #
NASA-CASE-LAR-13113-1 ..... N86-24867* #
NASA-CASE-LAR-13237-1 ..... N86-24960* #
NASA-CASE-LAR-13292-1 ..... N86-24841* #
NASA-CASE-LAR-13306-1 ..... N86-25292* #
NASA-CASE-LAR-13403-1 ..... N86-24673* #
NASA-CASE-LAR-13407-1 ..... N86-24909* #
NASA-CASE-LAR-13448-1 ..... N86-24840* #
NASA-CASE-LAR-13455-1 ..... N86-24830* #
NASA-CASE-LAR-13474-1-SB ..... N86-24814* #

NASA-CASE-MSC-20870-1 ..... N86-24977* #
NASA-CASE-MSC-20912-1 ..... N86-24879* #

NASA-CASE-NPO-16467-1-CU ..... N86-24908* #
NASA-CASE-NPO-16584-1-CU ..... N86-25269* #

NASA-CASE-10676-1 ..... N86-24729*

NASA-CR-3922(05) ..... N86-25109 #
NASA-CR-3966 ..... N86-25219* #
NASA-CR-3967 ..... N86-24990* #
NASA-CR-3973 ..... N86-25216* #
NASA-CR-3975 ..... N86-24659* #
NASA-CR-3977 ..... N86-25002* #
NASA-CR-3980 ..... N86-24660* #
NASA-CR-3984 ..... N86-24661* #
NASA-CR-166618 ..... N86-24704* #
NASA-CR-166620 ..... N86-25169* #
NASA-CR-168349 ..... N86-25100* #
NASA-CR-174708 ..... N86-24693* #
NASA-CR-174709 ..... N86-25040* #
NASA-CR-174710 ..... N86-24991* #
NASA-CR-174815 ..... N86-25046* #
NASA-CR-174843 ..... N86-24746* #
NASA-CR-174884 ..... N86-24938* #
NASA-CR-174891 ..... N86-24931* #
NASA-CR-174904 ..... N86-24878* #
NASA-CR-174905 ..... N86-24877* #
NASA-CR-174952 ..... N86-25003* #
NASA-CR-174994 ..... N86-25302* #
NASA-CR-175016 ..... N86-24875* #
NASA-CR-175017 ..... N86-24876* #
NASA-CR-175019 ..... N86-24846 #
NASA-CR-175020 ..... N86-24695* #
NASA-CR-175048 ..... N86-24818* #
NASA-CR-175058 ..... N86-24845* #
NASA-CR-175061 ..... N86-24760* #
NASA-CR-175094 ..... N86-25310* #
NASA-CR-175109 ..... N86-24691* #
NASA-CR-175111 ..... N86-24817 #
NASA-CR-176551 ..... N86-24761* #
NASA-CR-176670 ..... N86-25311* #
NASA-CR-176671 ..... N86-24965 #
NASA-CR-176672 ..... N86-24751* #
NASA-CR-176710 ..... N86-24905* #
NASA-CR-176745 ..... N86-24755* #
NASA-CR-176752 ..... N86-25078* #
NASA-CR-176754 ..... N86-24712* #
NASA-CR-176760 ..... N86-25142* #
NASA-CR-176761 ..... N86-25001* #
NASA-CR-176762 ..... N86-24730* #
NASA-CR-176763 ..... N86-25017 #
NASA-CR-176764 ..... N86-24933* #
NASA-CR-176765 ..... N86-24955* #
NASA-CR-176766 ..... N86-25069* #
NASA-CR-176771 ..... N86-24677* #
NASA-CR-176772 ..... N86-24932* #
NASA-CR-176773 ..... N86-24702* #
NASA-CR-176774 ..... N86-24906* #
NASA-CR-176775 ..... N86-25070* #
NASA-CR-176777 ..... N86-25042* #
NASA-CR-177867 ..... N86-25291* #
NASA-CR-177956 ..... N86-25215* #
NASA-CR-178015 ..... N86-24664* #
NASA-CR-178040 ..... N86-24745* #
NASA-CR-178058 ..... N86-25145* #
NASA-CR-178081 ..... N86-25176* #
NASA-CR-178082 ..... N86-25167* #
NASA-CR-178083 ..... N86-24678* #
NASA-CR-178091 ..... N86-24963* #
NASA-CR-178799 ..... N86-24957* #
NASA-CR-178802 ..... N86-24930* #
NASA-CR-178804 ..... N86-25143* #
NASA-CR-178806 ..... N86-25144* #
NASA-CR-178808 ..... N86-24750* #

NASA-CR-178819 ..... N86-24732* #
NASA-CR-178820 ..... N86-24733* #
NASA-CR-178821 ..... N86-24734* #
NASA-CR-178822 ..... N86-24735* #
NASA-CR-178828 ..... N86-24719* #
NASA-CR-178835 ..... N86-24720* #
NASA-CR-178836 ..... N86-24966* #
NASA-CR-178837 ..... N86-25121* #

NASA-EP-206 ..... N86-24714* #

NASA-RP-1155 ..... N86-25307*

NASA-SP-7011(284) N86-25111
NASA-SP-7037(199) N86-24653
NASA-SP-7041(49) ..... N86-25033 #
NASA-SP-7046(13) ..... N86-24713* #
NASA-SP-7056(01) N86-24711

NASA-TM-77855 ..... N86-24816* #
NASA-TM-77908 ..... N86-24736* #
NASA-TM-77948 ..... N86-25146 #
NASA-TM-83102 ..... N86-25122* #
NASA-TM-83199 ..... N86-25220* #
NASA-TM-85912 ..... N86-25166* #
NASA-TM-86081 ..... N86-25018* #
NASA-TM-86240 ..... N86-25030* #
NASA-TM-86541 ..... N86-24937* #
NASA-TM-86543 ..... N86-25305* #
NASA-TM-86544 ..... N86-24758* #
NASA-TM-86864-REV ..... N86-24839* #
NASA-TM-87090 ..... N86-25284* #
NASA-TM-87112 ..... N86-25218* #
NASA-TM-87154 ..... N86-24757* #
NASA-TM-87220 ..... N86-24934* #
NASA-TM-87227 ..... N86-25303* #
NASA-TM-87241 ..... N86-24964* #
NASA-TM-87242 ..... N86-24835* #
NASA-TM-87243 ..... N86-24836* #
NASA-TM-87246 ..... N86-24907* #
NASA-TM-87247 ..... N86-24869* #
NASA-TM-87249 ..... N86-24838* #
NASA-TM-87256 ..... N86-24959* #
NASA-TM-87258 ..... N86-25268* #
NASA-TM-87269 ..... N86-25267* #
NASA-TM-87270 ..... N86-24813* #
NASA-TM-87278 ..... N86-24748* #
NASA-TM-87281 ..... N86-24749* #
NASA-TM-87283 ..... N86-25039* #
NASA-TM-87285 ..... N86-24881* #
NASA-TM-87286 ..... N86-24961* #
NASA-TM-87289 ..... N86-24697* #
NASA-TM-87291 ..... N86-24756* #
NASA-TM-87295 ..... N86-24759* #
NASA-TM-87298 ..... N86-24658* #
NASA-TM-87301 ..... N86-24667* #
NASA-TM-87302 ..... N86-25217* #
NASA-TM-87306 ..... N86-24958* #
NASA-TM-87308 ..... N86-24837* #
NASA-TM-87313 ..... N86-25321* #
NASA-TM-87314 ..... N86-24747* #
NASA-TM-87322 ..... N86-24967* #
NASA-TM-87605 ..... N86-24686* #
NASA-TM-87634 ..... N86-24685* #
NASA-TM-87647 ..... N86-24737* #
NASA-TM-87661 ..... N86-24665* #
NASA-TM-87671 ..... N86-24672* #
NASA-TM-87707 ..... N86-24657* #
NASA-TM-87709 ..... N86-24744* #
NASA-TM-87711 ..... N86-24703* #
NASA-TM-87715 ..... N86-24731* #
NASA-TM-87720 ..... N86-25019* #
NASA-TM-87726 ..... N86-24663* #
NASA-TM-88263 ..... N86-24687* #
NASA-TM-88285 ..... N86-24936 #
NASA-TM-88387 ..... N86-24815* #
NASA-TM-88389 ..... N86-25177 #
NASA-TM-88390 ..... N86-24710* #
NASA-TM-88393 ..... N86-24770 #
NASA-TM-88394 ..... N86-24769* #
NASA-TM-88395 ..... N86-25237 #
NASA-TM-88396 ..... N86-25041 #
NASA-TM-88397 ..... N86-24844 #
NASA-TM-88398 ..... N86-24842 #
NASA-TM-88399 ..... N86-24910 #
NASA-TM-88407 ..... N86-24843 #
NASA-TM-88411 ..... N86-24701 #
NASA-TM-88414 ..... N86-25315* #
NASA-TM-88416 ..... N86-24868 #
NASA-TM-88418 ..... N86-24652 #
NASA-TM-88419 ..... N86-25000 #
NASA-TM-88659 ..... N86-25316* #
NASA-TM-88753 ..... N86-25320* #
NASA-TM-88755 ..... N86-25032 #

NASA-TP-2538 ..... N86-24992* #

NASA-TP-2557 ..... N86-24694* #
NASA-TP-2562 ..... N86-24722* #
NASA-TP-2564 ..... N86-25168* #
NASA-TP-2565 ..... N86-24662* #
NASA-TP-2582 ..... N86-24962* #
NASA-TP-2584 ..... N86-24709* #

NBA/SP-500/133 ..... N86-25140 #

NBS/SP-500/132 ..... N86-25162 #

NBS/TN-1083 ..... N86-24929 #
NBS/TN-1204 ..... N86-24928 #
NBS/TN-1216 ..... N86-24721 #

NBSIR-83/3228 ..... N86-24872 #
NBSIR-85/3029 ..... N86-24975 #
NBSIR-85/3205 ..... N86-24787 #
NBSIR-85/3223 ..... N86-24788 #

NCAR/CT-91 ..... N86-25096 #

NCEL-CR-86.004 ..... N86-24870 #
NCEL-CR-86.005 ..... N86-25021 #

NCEL-TN-1734 ..... N86-24912 #

NDRE/PUBL-86/1002 ..... N86-25112 #

NOAA-NWS-ERCP-35 ..... N86-25139 #

NOAA-TM-ERL-SEL-73 ..... N86-24902 #

NOAA-TM-NWS-SR-112 ..... N86-25094 #

NPS-52-86-002 ..... N86-25184 #
NPS-55-85-030 ..... N86-25185 #
NPS-61-86-008 ..... N86-25239 #

NPS52-85-014 ..... N86-25199 #
NPS52-86-003 ..... N86-25129 #
NPS61-86-006 ..... N86-24972 #
NPS63-85-002 ..... N86-25082 #
NPS63-85-003 ..... N86-25084 #
NPS69-85-028 ..... N86-24913 #
NPS74-85-002 ..... N86-25123 #

NRL-MR-5616 ..... N86-25222 #
NRL-MR-5651 ..... N86-25262 #
NRL-MR-5675 ..... N86-24985 #
NRL-MR-5678 ..... N86-24986 #
NRL-MR-5699 ..... N86-24829 #
NRL-MR-5702 ..... N86-24970 #
NRL-MR-5703 ..... N86-24980 #

NRL-8951 ..... N86-25079 #

NSMRL-1067 ..... N86-25124 #
NSMRL-1068 ..... N86-25125 #

NSWC/MP-85-466 ..... N86-25210 #

NSWC/TR-85-210 ..... N86-24774 #

NT-15/M/85 ..... N86-24789 #

NTSB/AAR-85/01/SUM ..... N86-24675 #

NTSB/SS-85/09 ..... N86-24676 #

NUREG-1046-F ..... N86-25236 #

NUREG/CR-4388 ..... N86-25067 #

NUSC-TD-7563 ..... N86-25221 #

ONR-TR-85-7 ..... N86-25181 #

ORNL-6262 ..... N86-24846 #

OST/BULL-65 ..... N86-25117 #

OSURF-760325/712792 ..... N86-24939 #

P/W/GPD-FR-18710 ..... N86-24781 #

PA-6502-01 ..... N86-24895 #

PB85-199164 ..... N86-25094 #
PB85-233211 ..... N86-24902 #
PB85-910409 ..... N86-24675 #
PB85-917014 ..... N86-24676 #
PB86-106945 ..... N86-24974 #
PB86-109485 ..... N86-25116 #
PB86-109964 ..... N86-25066 #
PB86-110806 ..... N86-25289 #

PB86-113545 ..... N86-25095 #
PB86-115680 ..... N86-24929 #
PB86-116548 ..... N86-25077 #
PB86-119617 ..... N86-25096 #
PB86-120654 ..... N86-24789 #
PB86-126687 ..... N86-25162 #
PB86-126836 ..... N86-24973 #
PB86-127016 ..... N86-25038 #
PB86-127081 ..... N86-25117 #
PB86-128097 ..... N86-25090 #
PB86-128683 ..... N86-25062 #
PB86-129756 ..... N86-24721 #
PB86-129954 ..... N86-25140 #
PB86-130044 ..... N86-24872 #
PB86-130234 ..... N86-24975 #
PB86-130937 ..... N86-24787 #
PB86-130986 ..... N86-24788 #
PB86-131349 ..... N86-24865 #
PB86-131398 ..... N86-24743 #
PB86-131828 ..... N86-25139 #
PB86-132032 ..... N86-24928 #
PB86-134756 ..... N86-25063 #
PB86-134764 ..... N86-25064 #
PB86-134772 ..... N86-25065 #
PB86-134780 ..... N86-25061 #
PB86-135100 ..... N86-25288 #
PB86-135779 ..... N86-25126 #
PB86-137338 ..... N86-25037 #
PB86-137627 ..... N86-24786 #
PB86-139326 ..... N86-24834 #
PB86-139524 ..... N86-25106 #
PB86-141371 ..... N86-25290 #
PB86-141967 ..... N86-25105 #
PB86-141991 ..... N86-25089 #
PB86-142072 ..... N86-25088 #
PB86-142114 ..... N86-25054 #
PB86-142262 ..... N86-25091 #
PB86-142270 ..... N86-25092 #
PB86-143773 ..... N86-25076 #
PB86-144623 ..... N86-25060 #
PB86-145828 ..... N86-25093 #
PB86-247682 ..... N86-25299 #

PFC/CP-85-4 ..... N86-25263 #

POLY-MRI-1451-86 ..... N86-25070* #

PPG-913 ..... N86-25073 #

PSD-FCR-5715 ..... N86-25040* #

PWA-5968-19 ..... N86-25003* #

RADC-TM-85-17 ..... N86-25127 #

RADC-TR-85-56 ..... N86-25004 #
RADC-TR-85-167 ..... N86-24895 #
RADC-TR-85-194-REV-B ..... N86-25007 #
RADC-TR-85-224 ..... N86-25279 #
RADC-TR-752-REV-B ..... N86-25007 #

RAE-TR-85046 ..... N86-25023 #

RAND/R-2367-NA ..... N86-25148 #

REPT-2-86 ..... N86-24730* #
REPT-84B0561 ..... N86-25018* #
REPT-85-SRD-030 ..... N86-24925 #
REPT-85-909-TUDEV-R1 ..... N86-25278 #
REPT-412U-2094-22 ..... N86-25145* #
REPT-40933-6021-UT-00 ..... N86-24845* #
REPT-41849-G159-026-APP ..... N86-25144* #
REPT-66338-01 ..... N86-24750* #
REPT-716199-8 ..... N86-24677* #

RI/RD85-257 ..... N86-24752 #

RSRE-MEMO-3859 ..... N86-24886 #
RSRE-MEMO-3891 ..... N86-25240 #

R84-956627-1 ..... N86-24693* #
R85-956642 ..... N86-24957* #
R85AEB452 ..... N86-24931* #

SAIC-86/1024 ..... N86-24862 #

SAND-85-1961C ..... N86-24819 #

SD-TR-85-64 ..... N86-24915 #
SD-TR-85-79 ..... N86-24851 #
SD-TR-85-85 ..... N86-25232 #
SD-TR-85-88 ..... N86-25051 #
SD-TR-85-89 ..... N86-25072 #
SD-TR-85-91 ..... N86-25071 #
SD-TR-85-92 ..... N86-24979 #

STI-TR-1206-1 ..... N86-24704* #

STS-85-0174-VOL-1 ..... N86-24733* #
STS-85-0174-VOL-2 ..... N86-24734* #
STS-85-0174-VOL-3 ..... N86-24735* #

STS85-0174-ADD ..... N86-24732* #

SU-LCS-TR-18 ..... N86-25207 #

SU-STAN-CS-85-1064 ..... N86-25173 #

SU-TR-369 ..... N86-25182 #

SYRU/DECE/TR-85/3 ..... N86-24887 #

TAMU-SG-86-202 ..... N86-25105 #

TI85-018096 ..... N86-25029 #
TI85-901777 ..... N86-25031 #
TI86-900108 ..... N86-25099 #
TI86-900170 ..... N86-25236 #
TI86-900237 ..... N86-25068 #
TI86-900242 ..... N86-25067 #

TR-D-81-ARO ..... N86-25204 #
TR-D-83-ARO ..... N86-25006 #

TR-1 ..... N86-25273 #
TR-3 ..... N86-24820 #
TR-3 ..... N86-25224 #
TR-15 ..... N86-25120 #
TR-17 ..... N86-24830 #
TR-19 ..... N86-24771 #
TR-20 ..... N86-24772 #
TR-33 ..... N86-25230 #
TR-39 ..... N86-25276 #
TR-85-37 ..... N86-24927 #
TR-458 ..... N86-25181 #
TR-729 ..... N86-24920 #
TR-0084A(5764)-1 ..... N86-24979 #
TR-0084A(5935-03)-1 ..... N86-24915 #
TR-0086(6524-04)-1 ..... N86-25051 #
TR-0086(6935-03)-1 ..... N86-24851 #
TR-0086(6940-05)-2 ..... N86-25072 #
TR-0086(6940-05)-12 ..... N86-25071 #
TR-0086(6945-04)-2 ..... N86-25232 #

TRW-41849-G159-024 ..... N86-25143* #

UCID-20539 ..... N86-25160 #

UCLA-ENG-85-28 ..... N86-25020 #

UDR-TM-86-02 ..... N86-24720* #
UDR-TM-86-03 ..... N86-24966* #

US-PATENT CLASS-29-572 ..... N86-25050
US-PATENT CLASS-137-114 ..... N86-24984
US-PATENT CLASS-315-241 ..... N86-25243
US-PATENT CLASS-326-3 ..... N86-24969 #
US-PATENT CLASS-525-432 ..... N86-24853
US-PATENT CLASS-568-766 ..... N86-24854
US-PATENT CLASS-364200 ..... N86-24893 #

US-PATENT-APPL-SN-539352 ..... N86-24984
US-PATENT-APPL-SN-539889 ..... N86-25243
US-PATENT-APPL-SN-580979 ..... N86-24969 #
US-PATENT-APPL-SN-587764 ..... N86-24729*
US-PATENT-APPL-SN-592033 ..... N86-24854
US-PATENT-APPL-SN-595153 ..... N86-24826
US-PATENT-APPL-SN-610911 ..... N86-25050
US-PATENT-APPL-SN-610912 ..... N86-24853
US-PATENT-APPL-SN-616380 ..... N86-24698
US-PATENT-APPL-SN-686954 ..... N86-24893 #
US-PATENT-APPL-SN-699889 ..... N86-25058 #
US-PATENT-APPL-SN-758899 ..... N86-24974 #
US-PATENT-APPL-SN-790714 ..... N86-24780 #
US-PATENT-APPL-SN-802769 ..... N86-25269* #
US-PATENT-APPL-SN-804040 ..... N86-24880* #
US-PATENT-APPL-SN-804193 ..... N86-24944 #
US-PATENT-APPL-SN-804196 ..... N86-24909* #
US-PATENT-APPL-SN-804201 ..... N86-24918 #
US-PATENT-APPL-SN-805008 ..... N86-24689 #
US-PATENT-APPL-SN-819652 ..... N86-24919 #
US-PATENT-APPL-SN-831183 ..... N86-24879* #
US-PATENT-APPL-SN-831371 ..... N86-24867* #
US-PATENT-APPL-SN-831372 ..... N86-24960* #
US-PATENT-APPL-SN-831377 ..... N86-24993* #
US-PATENT-APPL-SN-834978 ..... N86-24841* #
US-PATENT-APPL-SN-838648 ..... N86-24908* #
US-PATENT-APPL-SN-838654 ..... N86-24840* #
US-PATENT-APPL-SN-840825 ..... N86-24977* #
US-PATENT-APPL-SN-840900 ..... N86-24814* #
US-PATENT-APPL-SN-846427 ..... N86-24978* #
US-PATENT-APPL-SN-846428 ..... N86-24935* #

US-PATENT-APPL-SN-846429 ..... N86-24673* #
US-PATENT-APPL-SN-846430 ..... N86-25292* #
US-PATENT-APPL-SN-846439 ..... N86-24700* #

US-PATENT-CLASS-244-159 ..... N86-24729*
US-PATENT-CLASS-416-92 ..... N86-24698
US-PATENT-CLASS-436-5 ..... N86-24826

US-PATENT-4,538,635 ..... N86-24984
US-PATENT-4,540,339 ..... N86-24698
US-PATENT-4,540,833 ..... N86-24854
US-PATENT-4,544,713 ..... N86-24853
US-PATENT-4,546,320 ..... N86-24969 #
US-PATENT-4,546,429 ..... N86-24893 #
US-PATENT-4,547,956 ..... N86-25050
US-PATENT-4,548,903 ..... N86-24826
US-PATENT-4,550,275 ..... N86-25243
US-PATENT-4,579,302 ..... N86-24729*

USAAVSCOM-TM-85-F-7 ..... N86-25300 #

USAAVSCOM-TR-85-E-3 ..... N86-24883 #
USAAVSCOM-TR-85-F-1 ..... N86-24991* #
USAAVSCOM-TR-86-C-4 ..... N86-24818* #

USAFA-TR-86-3 ..... N86-25118 #

USARIEM-M-12/86 ..... N86-25110 #

USGS-BULL-1634 ..... N86-25099 #

USGS-OFR-84-664 ..... N86-25031 #

USGS/WRD/GA-85/1 ..... N86-25038 #

USGS/WRD/HD-85/246 ..... N86-25037 #
USGS/WRD/HD-85/259 ..... N86-25038 #

USGS/WRD/NY-84/2 ..... N86-25037 #

UVA/528213/CS86/108 ..... N86-25142* #

UWME-DR-301-102-1 ..... N86-24755* #

VPI-E-86.2 ..... N86-25027 #

WHOI-CONTRIB-5593 ..... N86-25102 #

WHOI-85-39 ..... N86-25103 #

YALEU/CSD/RR-431 ..... N86-25170 #

☆U.S. GOVERNMENT PRINTING OFFICE: 1986-491-573/40013

FEDERAL DEPOSITORY LIBRARIES

ALABAMA

AUBURN UNIV. AT MONTGOMERY LIBRARY
Documents Department
Montgomery, AL 36193
(205) 279-9110, ext. 253

UNIV. OF ALABAMA LIBRARY
Documents Dept.—Box S
University, AL 35486
(205) 348-7369

ARIZONA

DEPT. OF LIBRARY, ARCHIVES AND PUBLIC RECORDS
Third Floor—State Cap.
1700 West Washington
Phoenix, AZ 85007
(602) 255-4121

UNIVERSITY OF ARIZONA LIB.
Government Documents Dept.
Tucson, AZ 85721
(602) 626-5233

ARKANSAS

ARKANSAS STATE LIBRARY
One Capitol Mall
Little Rock, AR 72201
(501) 371-2326

CALIFORNIA

CALIFORNIA STATE LIBRARY
Govt. Publications Section
P.O. Box 2037
Sacramento, CA 95809
(916) 322-4572

COLORADO

UNIV. OF COLORADO LIB.
Government Pub. Division
Campus Box 184
Boulder, CO 80309
(303) 492-8834

DENVER PUBLIC LIBRARY
Govt. Pub. Department
1357 Broadway
Denver, CO 80203
(303) 571-2131

CONNECTICUT

CONNECTICUT STATE LIBRARY
Government Documents Unit
231 Capitol Avenue
Hartford, CT 06106
(203) 566-4971

FLORIDA

UNIV. OF FLORIDA LIBRARIES
Library West
Documents Department
Gainesville, FL 32611
(904) 392-0367

GEORGIA

UNIV. OF GEORGIA LIBRARIES
Government Reference Dept.
Athens, Ga 30602
(404) 542-8951

HAWAII

UNIV. OF HAWAII LIBRARY
Govt. Documents Collection
2550 The Mall
Honolulu, HI 96822
(808) 948-8230

IDAHO

UNIV. OF IDAHO LIBRARY
Documents Section
Moscow, ID 83843
(208) 885-6344

ILLINOIS

ILLINOIS STATE LIBRARY
Information Services Branch
Centennial Building
Springfield, IL 62706
(217) 782-5185

INDIANA

INDIANA STATE LIBRARY
Serials Documents Section
140 North Senate Avenue
Indianapolis, IN 46204
(317) 232-3686

IOWA

UNIV. OF IOWA LIBRARIES
Govt. Documents Department
Iowa City, IA 52242
(319) 353-3318

KANSAS

UNIVERSITY OF KANSAS
Doc. Collect—Spencer Lib.
Lawrence, KS 66045
(913) 864-4662

KENTUCKY

UNIV. OF KENTUCKY LIBRARIES
Govt. Pub. Department
Lexington, KY 40506
(606) 257-3139

LOUISIANA

LOUISIANA STATE UNIVERSITY
Middleton Library
Govt. Docs. Dept.
Baton Rouge, LA 70803
(504) 388-2570

LOUISIANA TECHNICAL UNIV. LIBRARY
Documents Department
Ruston, LA 71272
(318) 257-4962

MAINE

UNIVERSITY OF MAINE
Raymond H. Fogler Library
Tri-State Regional Documents Depository
Orono, ME 04469
(207) 581-1680

MARYLAND

UNIVERSITY OF MARYLAND
McKeldin Lib.—Doc. Div.
College Park, MD 20742
(301) 454-3034

MASSACHUSETTS

BOSTON PUBLIC LIBRARY
Government Docs. Dept.
Boston, MA 02117
(617) 536-5400 ext. 226

MICHIGAN

DETROIT PUBLIC LIBRARY
Sociology Department
5201 Woodward Avenue
Detroit, MI 48202
(313) 833-1409

MICHIGAN STATE LIBRARY
P.O. Box 30007
Lansing, MI 48909
(517) 373-0640

MINNESOTA

UNIVERSITY OF MINNESOTA
Government Pubs. Division
409 Wilson Library
309 19th Avenue South
Minneapolis, MN 55455
(612) 373-7813

MISSISSIPPI

UNIV. OF MISSISSIPPI LIB.
Documents Department
University, MS 38677
(601) 232-5857

MONTANA

UNIV. OF MONTANA
Mansfield Library
Documents Division
Missoula, MT 59812
(406) 243-6700

NEBRASKA

NEBRASKA LIBRARY COMM.
Federal Documents
1420 P Street
Lincoln, NE 68508
(402) 471-2045
In cooperation with University of Nebraska-Lincoln

NEVADA

UNIVERSITY OF NEVADA LIB.
Govt. Pub. Department
Reno, NV 89557
(702) 784-6579

NEW JERSEY

NEWARK PUBLIC LIBRARY
5 Washington Street
Newark, NJ 07101
(201) 733-7812

NEW MEXICO

UNIVERSITY OF NEW MEXICO
Zimmerman Library
Government Pub. Dept.
Albuquerque, NM 87131
(505) 277-5441

NEW MEXICO STATE LIBRARY
Reference Department
325 Don Gaspar Avenue
Santa Fe, NM 87501
(505) 827-2033, ext. 22

NEW YORK

NEW YORK STATE LIBRARY
Empire State Plaza
Albany, NY 12230
(518) 474-5563

NORTH CAROLINA

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL
Wilson Library
BA/SS Documents Division
Chapel Hill, NC 27515
(919) 962-1321

NORTH DAKOTA

UNIVERSITY OF NORTH DAKOTA
Chester Fritz Library
Documents Department
Grand Forks, ND 58202
(701) 777-2617, ext. 27
(In cooperation with North Dakota State Univ. Library)

OHIO

STATE LIBRARY OF OHIO
Documents Department
65 South Front Street
Columbus, OH 43215
(614) 462-7051

OKLAHOMA

OKLAHOMA DEPT. OF LIB.
Government Documents
200 NE 18th Street
Oklahoma City, OK 73105
(405) 521-2502

OKLAHOMA STATE UNIV. LIB.
Documents Department
Stillwater, OK 74078
(405) 624-6546

OREGON

PORTLAND STATE UNIV. LIB.
Documents Department
P.O. Box 1151
Portland, OR 97207
(503) 229-3673

PENNSYLVANIA

STATE LIBRARY OF PENN.
Government Pub. Section
P.O. Box 1601
Harrisburg, PA 17105
(717) 787-3752

TEXAS

TEXAS STATE LIBRARY
Public Services Department
P.O. Box 12927—Cap. Sta.
Austin, TX 78753
(512) 471-2996

TEXAS TECH UNIV. LIBRARY
Govt. Documents Department
Lubbock, TX 79409
(806) 742-2268

UTAH

UTAH STATE UNIVERSITY
Merrill Library, U.M.C. 30
Logan, UT 84322
(801) 750-2682

VIRGINIA

UNIVERSITY OF VIRGINIA
Alderman Lib.—Public Doc.
Charlottesville, VA 22901
(804) 924-3133

WASHINGTON

WASHINGTON STATE LIBRARY
Documents Section
Olympia, WA 98504
(206) 753-4027

WEST VIRGINIA

WEST VIRGINIA UNIV. LIB.
Documents Department
Morgantown, WV 26506
(304) 293-3640

WISCONSIN

MILWAUKEE PUBLIC LIBRARY
814 West Wisconsin Avenue
Milwaukee, WI 53233
(414) 278-3000

ST. HIST LIB. OF WISCONSIN
Government Pub. Section
816 State Street
Madison, WI 53706
(608) 262-4347

WYOMING

WYOMING STATE LIBRARY
Supreme Ct. & Library Bld.
Cheyenne, WY 82002
(307) 777-6344

National Aeronautics and
Space Administration
Code NTT-4
Washington, D.C.
20546

Official Business

Penalty for Private Use, $300

SPECIAL FOURTH-CLASS RATE
POSTAGE & FEES PAID
NASA
PERMIT No. G 27

NASA

POSTMASTER: If Undeliverable (Section 158
Postal Manual) Do Not Return